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U.S. Department of the Interior
Bureau of Land Management

FINAL

Klamath Falls Resource Area
2795 Anderson Ave., Bldg. 25
Klamath Falls, Oregon 97603

July 1995



Upper Klamath Basin and Wood River Wetland Resource Management Plan/ Environmental Impact Statement



Aerial photo of the Wood River property.

As the Nation's principal conservation agency, the Department of the Interior has responsibility for most of our nationally owned public lands and natural resources. This includes fostering the wisest use of our land and water resources, protecting our fish and wildlife, preserving the environmental and cultural values of our national parks and historical places, and providing for the enjoyment of life through outdoor recreation. The Department assesses our energy and mineral resources and works to assure that their development is in the best interest of all our people. The Department also has a major responsibility for American Indian reservation communities and for people who live in Island Territories under U.S. administration.

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United States Department of the Interior Bureau of Land Management

Klamath Falls Resource Area Office
Lakeview District Office

July 28, 1995

Dear Reader:

You are cordially invited to assist the Bureau of Land Management (BLM) in a planning process that is important to you and your interests. We ask for your participation in reviewing and evaluating this final of the Upper Klamath Basin Resource Management Plan/Environmental Impact Statement (RMP/EIS) which has been prepared in conformance with land use planning procedures established by the Federal Land Policy and Management Act of 1976.

This Proposed Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS) addresses resource management on approximately 3,200 acres of land acquired and administered by the Bureau of Land Management in the Klamath Falls Resource Area of the Lakeview District. This PRMP/FEIS is designed to stand alone from the draft RMP/EIS, which was published March 1, 1994. The land, known as the Wood River property, is located in the upper Klamath Basin approximately 25 miles north of the city of Klamath Falls, in Klamath County, Oregon. The name of the document is not intended to imply that the BLM will apply the type of management described in the plan to any land not administered by the BLM (that is, private lands). The management objectives described in this RMP could be followed for other lands acquired by the BLM or returned to BLM-administration in the upper Klamath Basin at a later date.

Public input has been an important part of the Wood River Wetland project from the very beginning. The public has devoted substantial effort to providing in-depth input on both the draft RMP/EIS and the PRMP/FEIS. The Klamath Falls Resource Area has held numerous public meetings, provided frequent opportunities for comment on the development of the management alternatives and their revisions, and received more than 50 comment letters (before, during, and after the "official" comment period). The Klamath Falls Resource Area planning team has assessed these comments throughout the process and used the input in making substantive changes in the Proposed Resource Management Plan and strengthening the Environmental Impact Statement. We sincerely appreciate the efforts of those who took the time to provide us with their comments. We feel that your efforts have resulted in a stronger and clearer resource management plan.

There are four management alternatives, each with a different emphasis and each addressing the planning issues in a different way. The primary purpose for acquiring the Wood River property is to restore it to a functioning wetland community; therefore three of the alternatives (including the Proposed alternative) include various wetland restoration components, while the No Action Alternative (required by law) doesn't. The suggestions/comments made were used to strike a reasonable balance between the diverse expressed desires of the public, considering relevant legal mandates. Many of the participants requested that we emphasize wetland restoration; others requested that we emphasize recreation uses; and still others desire that we protect and enhance natural values. The Preferred Alternative in the draft Resource Management Plan has been revised based on public comment and internal review and is now the proposed action.

If you desire assistance in understanding this document or wish to schedule a briefing/meeting, you should contact the Resource Area Office at (503) 883-6916. Further briefings/meetings to discuss and explain the proposed plan are currently being scheduled.

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If you would like me to further consider your interests/concerns as I make the final decisions which will guide the management of this public land for the next 10 to 20 years, please identify them in writing during the protest and comment period, which ends 30 days after the Environmental Protection Agency publishes its Notice of Availability in the Federal Register. Comments should be sent to:

Edwin J. Singleton
Bureau of Land Management
1000 South 9th Street
Lakeview, Oregon 97630

The final decisions will be based on the analysis in the Environmental Impact Statement, any additional data available, public input, management feasibility, policy, and legal constraints. Approval of the plan will be documented in a record of decision which will be made available to the public and mailed to all parties who were mailed this document. It is also important to note that resource management plan implementation usually involves further analysis and decision making, including public involvement and allows for protest of adverse decisions under 43 CFR Parts 4, 4100, and 5000.

The resource management planning process includes an opportunity for administrative review via a plan protest to the BLM Director if you believe the approval of a proposed resource management plan would be in error under 43 CFR 1610.5-2. Careful adherence to these guidelines will assist in preparing a protest that will assure the greatest consideration to your point of view.

Only those persons or organizations who participated in our planning process leading to this proposed resource management plan may protest. If our records do not indicate that you had any involvement in any stage in the preparation of the Klamath Falls Resource Area proposed Upper Klamath Basin and Wood River Wetland Resource Management Plan, your protest will be dismissed without further review. In effect, if you may be adversely affected, you must file a protest citing why and where the resource management plan is incorrect or not in compliance with existing laws, regulations, etc.

A protesting party may raise only those issues which he or she submitted for the record during the planning process. New issues identified during the protest period should be directed to the District Manager for consideration during plan implementation, as potential plan amendments, or as otherwise appropriate. If an issue is shared by several individuals or landowners or interest groups, a combined protest on the common neighborhood issue or concern may be mutually more efficient and effective. For example, several landowners around the planning area may wish to combine their concerns on a proposed management issue, such as water rights, that affects their common interests.

The period for filing a plan protest begins when the Environmental Protection Agency publishes in the Federal Register its Notice of Availability of the final environmental impact statement concerning the proposed resource management plan or amendment. The protest and comment period will end 30 days after the Environmental Protection Agency publishes its Notice of Availability in the Federal Register. There is no provision in BLM's regulations for any extension of time, and no extensions for filing protests will be granted. To be considered "timely", your protest must be postmarked no later than the last day of the protest period. Also, although not a requirement, we suggest that you send your protest by certified mail, return receipt requested.

Protests must be filed in writing to:

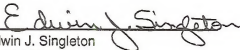
Director
Bureau of Land Management,
U.S. Department of the Interior,
Resource Planning (480),
P.O. Box 65775,
Washington, D.C. 20235

To be considered complete, your protest must contain, at a minimum, the following information:

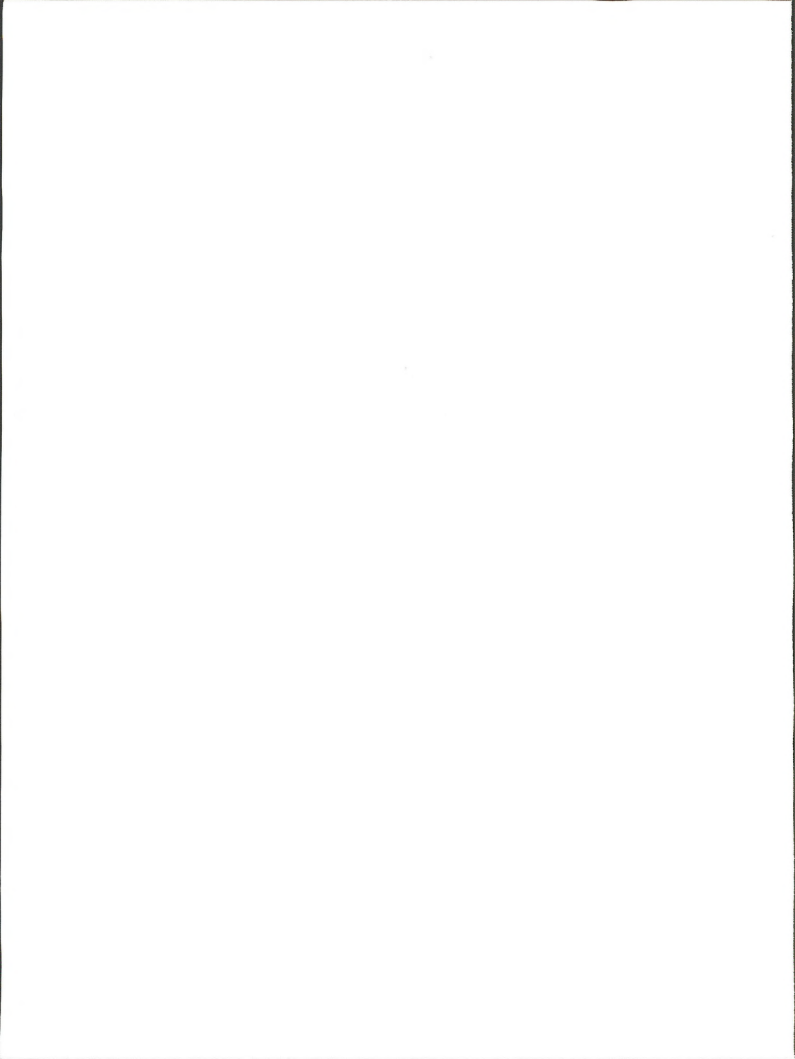
1. The name, mailing address, telephone number, and interest of the person filing the protest.
2. A statement of the issue or issues being protested.
3. A statement of the part or parts of the specific (named) proposed resource management plan being protested. To the extent possible, this should be done by reference to specific pages, paragraphs, sections, tables, maps, etc. included in the document.
4. A copy of all documents addressing the issue or issues that you submitted during the planning process or a reference to the date the issues were discussed by you for the record.
5. A concise statement explaining why the BLM State Director's decision is believed to be incorrect. This is a critical part of your protest. Document all relevant facts. As much as possible, reference or cite the planning documents, environmental analysis documents, and available planning records (for example, meeting minutes or summaries, or correspondence). A protest which merely expresses disagreement with the Oregon/Washington State Director's proposed decision, without any data, will not provide us with the benefit of your information and insight. In this case, the Director's review will be based on the existing analysis and supporting data.

Thank you for your interest in the multiple use management of BLM-administered lands.

Sincerely,


Edwin J. Singleton
District Manager
Lakeview District

6-16-95
Date



U.S. Department of the Interior
Bureau of Land Management

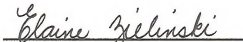
**Proposed Resource Management Plan/
Final Environmental Impact Statement**

for the

**Upper Klamath Basin and
Wood River Wetland**

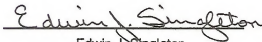
Prepared by the

Klamath Falls Resource Area of the
Lakeview District
July 1995



Elaine Zielinski

State Director, Oregon/Washington



Edwin J. Singleton

District Manager, Lakeview District



Roy L. Maslinton

Acting Area Manager, Klamath Falls Resource Area

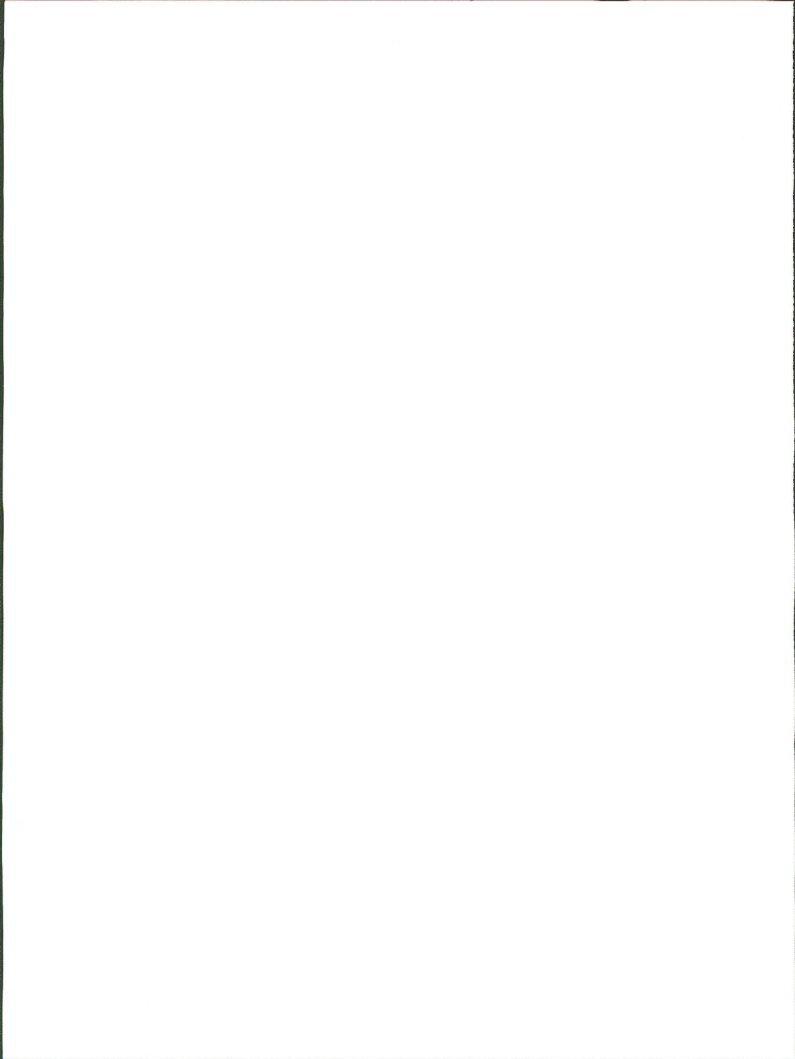


Upper Klamath Basin Wood River Wetland Resource Management Plan and Environmental Impact Statement

Draft () Final (X)
Department of the Interior
Bureau of Land Management

1. Type of Action: Administrative (X) Legislative ().
2. Abstract: This Final Resource Management Plan/Environmental Impact Statement (RMP/EIS) addresses resource management on approximately 3,200 acres of land acquired and administered by the Bureau of Land Management in the Klamath Falls Resource Area of the Lakeview District. This land, known as the Wood River property, is located in the upper Klamath Basin approximately 25 miles north of the city of Klamath Falls, in Klamath County, Oregon. Four alternatives, including the No Action alternative (continuation of existing management direction), are analyzed. These alternatives range from continuing current livestock grazing practices and economic values to restoration and management of wetlands. The main goal of the Preferred Alternative would be to restore the Wood River property to its previous function as a wetland community, within unalterable constraints (such as water rights, land ownership patterns, and funds). The Proposed Action would include both wetland restoration and stream restoration methods. The area would be declared an area of critical environmental concern and Special Recreation Management Area, and would be managed for low to moderate recreation use. Management objectives described in this RMP could be followed for other lands acquired by the BLM or returned to BLM-administration in the upper Klamath Basin.
3. The final RMP/EIS will be made available in July 1995. The protest period will end 30 days after the Environmental Protection Agency publishes its Notice of Availability in the Federal Register, expected on or about July 28, 1995. The final EIS is not intended to fulfill any other environmental review or consultation requirements pursuant to 40 CFR 1502.25(a). Although several other agencies contributed to the final EIS, the BLM is the sole preparing agency.
4. For further information contact:

Wedge Watkins, Wood River Project Coordinator
Bureau of Land Management
Klamath Falls Resource Area
2795 Anderson Avenue, Bldg. 25
Klamath Falls, OR 97603
5. The people responsible for preparing the RMP/EIS are A. Barron Bail, BLM Klamath Falls Resource Area manager and Edwin J. Singleton, BLM Lakeview District manager. The final decisions will be made by Elaine Zielinski, BLM Oregon/Washington State Director.



User's Guide

This proposed resource management plan/final environmental impact statement (PRMP/FEIS) is divided into five chapters and several appendices, as well as other miscellaneous material, such as an Abstract, Summary, List of Acronyms, Glossary, and Bibliography. In addition, the Table of Contents includes a list of tables and maps for both the text and the appendices. This PRMP/FEIS contains the text, maps, and other miscellaneous materials needed to assist the public and decision maker in choosing a management direction for the Wood River property in the upper Klamath Basin. This User's Guide is to assist the reader in using the PRMP/FEIS.

The Summary presents a synopsis of the final PRMP/FEIS. It summarizes all the alternatives, including more detail for the Proposed Action. Land use allocations for all issues are summarized. It also includes a summary of the environmental consequences and brief descriptions of monitoring, consistency with other government plans, and public involvement.

A list of Acronyms follows the Table of Contents, which follows this User's Guide, to assist the reader in reading the document. The list of Acronyms is placed at the front of the document to make it easier to find and use.

Chapter 1 is the Introduction to the PRMP/FEIS. This chapter includes a description of the planning area and the purpose and need for preparing the PRMP/FEIS. It also includes a discussion of the PRMP's relationship to BLM policies, programs, and other plans and describes the planning process and planning criteria. Finally, it identifies the issues and concerns addressed in the PRMP/FEIS process.

Chapter 2 (Affected Environment) describes the existing environment that could be affected or changed by implementing any of the alternatives. The descriptions presented in this chapter are related to the issues identified in Chapter 1. This includes a description of the resource values, such as water resources, vegetation, wildlife habitat, visual resources, etc.

Chapter 3 (Description of the Alternatives including the Proposed Action) begins with a summary of the goals of each alternative, as well as the alternatives that were dropped from detailed study. The management direction is discussed for each alternative providing a mix of uses and actions that respond to, or resolve, the issues identified in Chapter 1.

Chapter 4 (Environmental Consequences) describes potential effects on the resources and land uses (or affected environment as described in Chapter 2) for each of the alternatives, if they were implemented. The chapter is organized by the effects on a particular resource and then a comparison of the alternatives.

Chapter 5 lists the agencies, organizations, and individuals that the BLM either contacted or received input from during the preparation of the PRMP/FEIS; and the agencies, organizations, and individuals that received a copy of the draft RMP/EIS. A list of the RMP/EIS team, other contributors, and the Wood River Wetland Team is also included in the chapter.

Appendices follow Chapter 5. Most of the appendices are fairly technical and are not necessarily meant for the general public, but rather to provide supporting documentation for specialists. Also included in the document are a list of tables and maps, Glossary, Bibliography, and Index to help the reader understand some of the more technical aspects of land management or just find their particular topic(s) of interest.

Further questions or information on this PRMP/FEIS can be answered or obtained at the Klamath Falls Resource Area office during regular business hours.

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Acronyms

ACEC	Area of Critical Environmental Concern
ALC	American Lands Conservancy
AMP	Allotment Management Plan
AQMA	Air Quality Management Area
AS	BLM Assessment
AUM	Animal Unit Month
BLM	Bureau of Land Management
BMP	Best Management Practices
CEQ	Council of Environmental Quality
CFR	Code of Federal Regulations
CFS	Cubic feet per second
DEIS	Draft Environmental Impact Statement
DEQ	Oregon Department of Environmental Quality
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FC	Federal Candidate (species)
FE	Federal Endangered
FEIS	Final Environmental Impact Statement
FLPMA	Federal Land Policy and Management Act
FT	Federal Threatened
FY	Fiscal Year
GIS	Geographic Information System
IDT	Interdisciplinary Team
KFRA	Klamath Falls Resource Area
MG/L	Milligrams per liter
MOU	Memorandum of Understanding
NA	No Action (alternative)
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NRHP	National Register of Historic Places
NWSRA	National Wild and Scenic Rivers Act
OAR	Oregon Administrative Rules
ODA	Oregon Department of Agriculture
ODF	Oregon Department of Forestry
ODFW	Oregon Department of Fish and Wildlife
ONHP	Oregon Natural Heritage Program
ORS	Oregon Revised Statutes
ORV	Outstandingly Remarkable Values (for wild and scenic rivers)
OSMP	Oregon Smoke Management Plan
OSU	Oregon State University
OWRD	Oregon Water Resources Department
PA	Preferred Alternative
PM	Particulate Matter
PNC	Potential Natural Communities
PPM	Parts Per Million
RMA	Riparian Management Area
RMP	Resource Management Plan
ROD	Record of Decision
WRWT	Wood River Wetland Team

Upper Klamath Basin and Wood River Wetland Resource Management Plan/ Environmental Impact Statement Summary

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Introduction

The Upper Klamath Basin Resource Management Plan (RMP) will establish guidelines for the management of the BLM-administered land on the Wood River property of the upper Klamath Basin in the Klamath Falls Resource Area of the Lakeview District for approximately ten to twenty years. The Proposed RMP/Final Environmental Impact Statement (EIS) has been prepared in accordance with the BLM planning regulations issued under authority of the Federal Land Policy and Management Act and written in accordance with the Council on Environmental Quality regulations issued under authority of the National Environmental Policy Act. A team, called the Wood River Wetland Team, was formed by the BLM to assist with development of the RMP/EIS. This team is open to all interested parties and is used to review and provide comment on the management of this property.

The BLM-administered lands in Klamath County consist of 215,000 acres of surface and subsurface estate and 21,000 acres of BLM subsurface estate only (private or state owned surface). The planning area currently consists of approximately 3,220 acres of BLM-administered surface estate at the mouth of the Wood River. The Wood River property lies at the upper end of the Klamath Basin, approximately 25 miles north of the city of Klamath Falls, Oregon. The parcel is basically flat, with elevations ranging from approximately 4,133 to 4,141 feet above sea level on the main property's interior and up to 4,150 feet along the exterior dikes. It is bounded on the east by the Wood River and the Wood River Marsh, approximately 300 acres of permanently flooded marsh; on the west by Sevenmile Creek; on the north by a dike; and on the south by Agency Lake. The south end is diked to keep Agency Lake from flooding most of the parcel.

Newly acquired lands in this area will be managed for consistency with management objectives of nearby BLM-administered land. If lands with unique or fragile resource values are acquired, the BLM would protect or enhance those values until the next plan revision.

Management Alternatives

Four alternatives were developed and fully considered to meet the purpose and need of managing the Wood River property, while addressing issues and concerns of the BLM, the public, and the inter-agency/public Wood River Wetland Team (WRWT). Issues identified in the public meetings and by the WRWT include wetland restoration (what habitat types will be emphasized, how and when will the restoration occur), special status species (what will be done for endangered suckers), fish and wildlife habitat (which species will the BLM manage for), funding (where is funding for management of property and research projects coming from, and is it guaranteed for the long term), economics and land tenure (how will the tax roles be equalized), recreation opportunities (will the property be open to hunting and fishing, what type of recreation facilities will be provided), access (what level of public access will be allowed), water resources (what will happen with water rights, how will water quality be improved), livestock grazing (will it still be allowed and if so, how much), and public involvement (what level of public involvement will occur).

Each alternative offers a possible course of action that, if selected, would provide guidelines for future, more specific management decisions. Site-specific management actions would be guided by the principles described in the final plan.

The four management alternatives that were analyzed are described, starting with the alternative's objective and a summary paragraph. The Proposed Action discussion includes the management objective for each resource.

The four alternatives are: Alternative A, the No Action Alternative, which is a continuation of current BLM management from the time of purchase; Alternative B, which is a wetland restoration alternative that generally employs fairly simple methods that are low technology; Alternative C, which is a wetland restoration alternative that generally employs more structured and engineered technology; and Alternative D, the Proposed Action as developed by the BLM and the WRWT, which is a combination of the other three alternatives. Management actions in these alternatives would be on BLM-administered lands and would not adversely affect adjacent landowners. Management alternatives (except Alternative A) were developed to meet the long-term goals and objectives for the Wood River property.

See Table S-1 at the end of the Summary for a brief comparison of the alternatives. Table S-2, at the end of the Summary, briefly compares the effects of the alternative management actions on the various resources.

Alternative A (No Action)

Alternative A, referred to as the No Action Alternative, can be better described as a continuation of current management direction from the time of the BLM's purchase of the Wood River property. Some actions are different than those occurring when the property was in private ownership because of laws, policies, and manuals that the BLM must follow when managing federal land; however, except for some minor resource protection measures, the No Action Alternative is basically the same as what would have occurred under private ownership. This alternative should not be misinterpreted to be an alternative where the BLM does no active management.

Objective: To maintain the current use of the property as predominantly for livestock grazing in an irrigated pasture.

Current management direction on the Wood River property would be continued. Livestock grazing would continue, with up to 650 head/pairs of cattle each year (up to a maximum of 3,600 animal unit months). Water would be pumped off in the spring at current schedules. The amounts of upland, wet meadow, and marsh habitat would remain constant. Recreation resources would be managed for minimum use levels. The property would be closed to unauthorized motorized vehicle use.

Alternative B

Objective: To restore the Wood River property to a functioning wetland with diverse plant communities and healthy, productive vegetation.

The majority of the Wood River property would be restored to a functioning wetland consistent with the long-term goals. Under this alternative, initial management actions could require highly engineered techniques, such as restoring the Wood River and Sevenmile Creek to their historic meandering channels; however, in the long-term, wetland restoration systems and methods would be designed for minimum maintenance using the existing landscape features (such as topography) and natural energies (such as stream flows) of the property. Vegetation management (including water level fluctuations, fire, and mechanical manipulation) would be used to

develop diversity in plant communities and to maintain healthy and productive vegetation. The amounts of upland habitat would decrease, while wetland habitat, such as wet meadows and marshes, would increase. Recreation resources would be managed for moderate use levels.

Alternative C

Objective: To restore the Wood River property to a functioning wetland with diverse plant communities and healthy, productive vegetation.

The majority of the Wood River property would be restored to a functioning wetland consistent with the long-term goals. Under this alternative, both initial and long-term wetland restoration could involve highly engineered techniques, complex designs, experimental methods, and/or pilot projects. The intent of these systems would be to improve water quality entering Agency Lake from the property. When a system was developed with acceptable performance, the entire parcel could be converted to that system design. Research would figure more prominently in this alternative, and would encompass both the methods used for wetland restoration and the effects that restoration had on water quality and quantity, fish and wildlife habitat, and other relevant parameters. Vegetation management (including water level and flow fluctuations, livestock grazing, fire, and chemical and mechanical manipulation) would be used to develop desired plant communities. Shallow water wetland habitat would be emphasized. Recreation resources would be managed for high use levels, and would emphasize education and interpretation.

Alternative D Proposed Action

Objective: To restore the Wood River property to functioning wetland community, within unalterable constraints (such as water rights, land ownership patterns, and funds).

The Wood River property would be restored to its previous function as a wetland community, within unalterable constraints (such as water rights, land ownership patterns, and funds). Long-term improvements in water quality entering Agency Lake from the property would be a goal; however, localized decreases in water quality could occur in the short term. Improving and increasing wetland and riparian habitats for federally listed fish and other wildlife

Summary

would be emphasized. Labor-intensive, highly-engineered wetland restoration methods using complex designs would be allowed; however, the preference would be to use wetland restoration systems and methods that were designed with less labor-intensive practices using the existing landscape features (such as topography) and natural energies (such as stream flows) of the property. Vegetation management (including water level and flow fluctuations, livestock grazing, fire, chemical and mechanical manipulation) could be used to develop desired plant communities. Pilot studies would be allowed. Adaptive management, the process of changing land management as a result of monitoring or research, would be used. Recreation resources would be managed for low to moderate use levels.

Resource-Specific Management Objectives under Alternative D

Management objectives for each resource or program and the management actions to achieve these objectives are described in Chapter 3 of the plan. The resource/program objectives are repeated here:

Water Resources

To improve the quality and quantity of water entering Agency Lake from the property.

Stream Channel Restoration:

Objective: To provide a wider riparian area and floodplain along Wood River and Sevenmile Creek that would allow for meandering flow patterns to develop. Encourage vegetation diversity, channel sinuosity, and complexity. This restoration would only occur within BLM-administered lands, would be consistent with Oregon State water laws, and would be designed to not adversely affect water use or rights of other landowners.

Stream channel restoration would be accomplished initially through Option 4 discussed in Table 5 of the plan. Essentially, this means that new levees would be constructed 50 to 400 meters toward the interior of the property from the current locations. New channel meanders could be constructed between the new levee and the old levee along the west side of the Wood River. Restoration of meandering flow patterns would then be accomplished by removing portions of the existing levees along the streams. Other portions of the existing levees could be left in place or used to encourage meanders in the existing dredged channels. A wider riparian area and floodplain would be created along these streams. Natural

processes would then be relied on to establish overflow channels, backwater areas, and to increase the sinuosity and complexity of the Wood River and Sevenmile Creek. This approach will allow the streams to establish their own courses across the floodplains over time. The long-term goal would be narrow, deeper, and more sinuous channels with wider riparian areas.

Because the Wood River channel has been less altered, and has the greatest potential to respond to restoration activities in the shortest period of time, restoration of the Wood River channel would be a higher priority than Sevenmile Creek. Therefore, restoration activities would be implemented first along the Wood River.

Wetland Restoration

Objective: To restore the majority of the Wood River property to a functioning wetland community dominated by native wetland plant species. Vegetation management could occur using several methods, including but not limited to water level fluctuations, livestock grazing, haying, planting and seeding, prescribed fire, and mechanical or chemical methods. Vegetation manipulation would be designed to develop species diversity and to maintain healthy and productive stands of native riparian and wetland vegetation. One or two small-scale, reversible pilot projects could be constructed to provide additional information on effects on water quality, effects on wetland habitat, or for research purposes; however these projects would take up a very small portion (less than 5 acres) of the property, unlike the pilot projects under Alternative C, which could include a majority of the property.

Wetland restoration would be accomplished through Options 1 and 2 shown in Table 5 of the plan. Option 1 will be applied to the restoration of the entire property. Internal wetland cells will be designed in such a way that Option 2 could be incorporated on a portion of the south half of the property.

Options 1 and 2 would provide wetland restoration through the use of a system of 4 to 8 cells, water control structures, and pumps that will allow hydrologic control to be maintained on the property. This hydrologic control will allow for greater biological diversity to develop. This system of cells and structures will facilitate a wide array of management options (for example maintaining different water levels in different cells), including periodic aeration of the soil surface. Intermixing of waters from the wetland with those of Agency Lake could still be incorporated using this approach on a portion of the wetland.

Soil Resources

To ensure that undue degradation of soils would not occur.

Visual Resources

To ensure management actions meet Visual Resource Management Class II objectives.

Special Status Species Habitat

Objective: To manage for a diversity of habitats for special status species (see Table S-1). To protect habitats of federally listed or proposed threatened or endangered species; to avoid contributing to the need to list category 1 and 2 federal candidate, state listed, and Bureau sensitive species. Maintain a viable population of spotted frogs on the property.

Management of special status species habitats would also be consistent with the Klamath Falls Resource Area's approved Resource Management Plan. If any special status species (federally or state listed as threatened or endangered, federally proposed as threatened or endangered, category 1 and 2 federal candidate, and Bureau sensitive) are suspected in an area proposed for a management activity, field surveys would focus on those species. If populations of these species were found, then the plants or animals and their habitats would be protected through modification or abandonment of management actions as appropriate to eliminate impacts to federally listed or proposed species and to not contribute to the need to list category 1 and 2 federal candidate, state listed, or Bureau sensitive species.

If a project could not be altered or abandoned to eliminate a potential effect on a federally listed or proposed threatened or endangered species, then consultation with the U.S. Fish and Wildlife Service would be initiated under section 7 of the Endangered Species Act.

For state listed and state proposed species, the BLM would coordinate with the appropriate state agency to develop policies that would assist the state in achieving its management objectives for those species.

Fish and Wildlife: Management actions for special status fish species would include removal and movement of portions of existing levees and dikes. Encourage natural processes to form a more sinuous channel with greater habitat complexity in the Wood

River and in portions of Sevenmile Creek. The placement of natural structures such as logs and boulders will be considered to achieve desired channel conditions and increase the amount of cover for fish.

Plants: Inventories would be conducted if appropriate habitat is identified. Coordinate and cooperate with the Oregon Department of Agriculture regarding management activities with potentially adverse effects on a state listed or proposed plant species.

Fish and Wildlife Habitat

Objective: To improve habitat conditions for suckers and salmonids; to improve habitat for raptors and neotropical migratory birds; and to optimize waterfowl habitat within the constraints of other resource objectives.

Native tree species would be planted in clumps along major dikes for cover and future nest and perch sites, as well as to mitigate dike erosion. Portions of levees would be planted with native shrubs to provide nesting and roosting areas for neotropical migrant birds. Vegetation management (using water fluctuations, livestock grazing, prescribed fires, mechanical or chemical manipulation, or other methods) could be used to maintain, enhance, or create diverse habitats within the wetland. Riparian habitat along the Wood River and Sevenmile Creek would be restored and maintained by planting riparian vegetation and protection from grazing. River meanders would be encouraged to improve fisheries habitat. Channel morphology and substrate would be studied as they relate to factors limiting fish production, and would be modified as necessary to encourage natural sinuosity and narrow, deep channels

Nest islands, upland areas, and other structures could be developed to provide wildlife habitat.

Recreation

Objectives: To provide opportunities for roamed natural and semi-primitive recreation experiences (opportunities to have a high degree of interaction with the natural environment, to have moderate challenge and risk and to use outdoor skills). To manage the area for low (6 to 10 parties per day) to moderate (10 to 50 parties per day) recreation use levels (moderate near developed sites and roads, and low to moderate in other areas). To manage for day use only.

Summary

Recreation use and facilities would be secondary to the overall objective of wetland restoration and water quality improvement. Continue the existing restrictions on motorized access as necessary during the hunting season, pending further monitoring of recreation use levels and needs. Greater motorized access and increased use level could be allowed outside of the hunting season.

An improved parking area (graveled or paved) at or near the entrance to the Wood River property, sufficient to hold 20 to 25 vehicles (for peak use periods) would be provided. The facilities provided would meet the roaded natural and semi-primitive recreation opportunity objectives. Some suitable materials for visually screening the parking area adjacent homeowners would be considered. A toilet, 1 to 2 picnic tables, garbage cans, and interpretive signs could also be provided at the parking area.

In addition to use levels, the BLM would consider user convenience, safety, and resource protection when determining what recreation facilities to provide. Such facilities could include, but are not limited to, improved (graveled or paved) parking areas and roads, toilets, interpretive signing, nature trails (canoe, foot, mountain bike, horseback, and/or ski trails), and a boat ramp to access Wood River. The BLM would coordinate construction activities with the Oregon Department of Environmental Quality, US Fish and Wildlife Service, and the Army Corps of Engineers (among others) when designing and constructing recreation facilities.

Special Areas

Objective: To manage the property as an area of critical environmental concern (ACEC); and to protect and restore the area's relevant and important values, which are cultural, fish and wildlife values, and natural processes and systems.

The Wood River property was evaluated for designation as an ACEC and found to meet the relevance and importance criteria and evaluation process as described in Appendix 6 of the plan. The Wood River property would be designated an ACEC. The approved Upper Klamath Basin and Wood River Wetland Resource Management Plan/Record of Decision will serve as the management plan for the area.

Cultural Resources

To protect known cultural resources (including both historic and prehistoric resources).

Roads and Facilities

To provide adequate roads and facilities (quality and quantity) to support management objectives

Mineral Resources

To pursue acquisition of mineral estate, if the opportunity arises, and to ensure mineral activity does not conflict with other management goals. If the mineral estate remains in private ownership, the objective would be to work with the private owner to prevent mineral activity from conflicting with other management goals, to the extent possible.

Livestock Grazing

To use livestock grazing as a vegetation management tool to support the primary goal of wetland restoration, if and where appropriate.

Fire Management

To suppress all wildfires, and to reintroduce fire as an ecosystem process by using prescribed burning as a management tool to support the primary goal of wetland restoration.

Noxious Weed Management

To manage noxious weed species to facilitate restoration and maintenance of desirable plant communities and healthy watersheds; to prevent introduction, reproduction, and spread of noxious weeds into and within the resource area; and to manage existing populations of noxious weeds to levels that minimize the negative impacts of noxious weed invasions.

Monitoring The RMP

Monitoring and evaluation of the resource management plan would be carried out at appropriate intervals for the following purposes:

- ◆ To be sure activities are occurring in conformance with the plan.

- ◆ To determine if activities are producing the expected results.
- ◆ To determine if activities are causing the effects identified in the environmental impact statement.

See Appendix B of the plan for more information.

Consistency with State, Local, Tribal, and Other Federal Plans

The BLM planning regulations require that resource management plans be consistent with officially approved or adopted resource-related plans, and the policies and procedures therein, of federal agencies, state and local governments, and Indian tribes, so long as the RMPs are also consistent with applicable federal laws and regulations. The BLM has compared the Proposed Action of this Proposed RMP with plans from other agencies. This alternative appears to be consistent with all such plans, policies, and procedures.

Public and Interagency Involvement

The Wood River acquisition was initiated by the public and the Klamath Basin Water Resources Advisory Committee, who solicited the Congress in the fall of 1992 to appropriate funding for the BLM to purchase the property. Since then, public involvement has been an integral part of the Wood River planning process.

The BLM held scoping meetings in January 1993 and 18 meetings of an interagency team (including members of the public) have been held since May 1993. The US Fish and Wildlife Service, Bureau of Reclamation, U.S. Environmental Protection Agency,

Klamath Tribes, Oregon Department of Fish and Wildlife, and Oregon Department of Water Resources are cooperating agencies in the preparation of this RMP/EIS.

To date, public involvement has included information mailers, public meetings, field trips, distribution of planning documents, document review and comment periods, informal contacts and group meetings, as well as the development of the Wood River Wetland Team (discussed further in a later paragraph). Comment letters and other input received since the scoping began, have been considered while preparing the alternatives.

In the spring of 1993, the BLM formed an interdisciplinary, interagency team called the Wood River Wetland Team (WRWT), to assist with planning for and management of the Wood River property. Team members include federal, state, and local government agencies; the Klamath Tribes; interest groups; neighboring landowners; and other interested individuals. It has been, and continues to be, open to anyone interested in participating.

The WRWT reviewed the Affected Environment and Environmental Consequences, and assisted with development of management alternatives, including the Proposed Action. They reviewed the comment letters on the draft EIS, and assisted in the development of the final EIS based on those comments. The WRWT will be reviewing proposed projects to ensure they are consistent with management goals for the property.

The draft RMP/EIS was released for public review and comment from March 1, 1994 until June 17, 1994, for incorporation into this proposed RMP/final EIS. After comments were received, they were evaluated. Substantive comments have lead to changes in the analysis of environmental consequences and to three of the RMP alternatives. Any protests on this document will be reviewed and addressed by the Director of the BLM before a Record of Decision on the RMP is approved and published.

Table S-1. Summary of Management Actions

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Air Resources	Monitor air quality to meet goals of the Federal Clean Air Act, Oregon Implementation Plan, and Oregon Smoke Management Plan.	Same as A.	Same as A.	Same as A.
Water Resources	Restrict grazing in riparian areas and Wood River Marsh.	No Grazing.	Grazing used only to manipulate vegetation to accomplish management goals.	Same as C.
	Continue current irrigation system	Restore property to wetlands opting for low maintenance methods when feasible.	Maximize treatment of water quality with engineered projects.	Restore wetlands through a combination of an engineered system and natural processes.
	Continue periodic dredging of Wood River.	Improve water quality entering Agency lake through passive filtration.	Improve water quality entering Agency lake through engineered systems/pilot projects.	Improve water quality entering Agency Lake through changes in current management practices, an engineered system, and passive filtration.
	Complete current water quality studies.	Use current irrigation system to manipulate wetlands.	Choose most effective pilot projects for long-term implementation.	Modify current irrigation system to manipulate water levels/soil moisture conditions to maintain a functioning wetland. Cooperate in studies to determine effectiveness of wetland systems in improving water quality and storage.

Table S-1. Summary of Management Actions

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Stream Channel	None	Restore Wood River's meandering flow in the Wood River Marsh. (Option 1)	Same as B.	Relocate levees along the Wood River and Sevenmile Creek to be 50 to 400 meters interior from the existing locations. Encourage the creation of meandering flow patterns within the now wider riparian zones/ floodplains. (Option 4)
		Restore Wetland by establishing meandering flow for Sevenmile Creek through main property. Option 2)	Same as B.	
		Restore wetland by establishing meandering flow for Wood River Creek through main property. (Option 3)	Same as B.	
Wetland Restoration	None	Restore wetland by operating the existing canal and pump system (Option 1 - 2 cells).	Same as B (9 to 20 cells).	Same as B (4 to 8 cells).
		Restore wetland by reestablishing the lake/wetland interface (opening the property) to prevailing water levels in Agency Lake Option 2).	Same as B.	Same as B.
		Restore wetland supported by inflows from Sevenmile Creek (no pre-defined path) and outflow to Agency Lake (Option 3).	Construct and operate small pilot study areas to refine design details and operating procedures to proceed with wetland restoration (Option 5).	Same as B.
		Restore wetland supported by inflows from Wood River (no pre-defined path) and outflow to Agency Lake (Option 4).	Establish a wetland water quality treatment system designed to provide specific characteristics that enhance water treatment performance (Option 6).	Same as B.

Table S-1. Summary of Management Actions

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Soil Resources	Design management actions to mitigate soil degradation.	Design and monitor management actions to ensure that undue degradation of soils would not occur.	Same as B.	Same as B.
Visual Resources	Meet VRM Class IV objectives.	Meet VRM Class II objectives.	Meet VRM Class III objectives	Same as B
Special Status Species	Survey for suspected special status species. If found protect by modifying or dropping the proposed activity and/or consulting with USFWS.	Same as A. In addition, place structures in and along stream and creek banks for suckers.	Same as B. In addition, create or enhance other habitat. Install perches for bald eagles.	Same as B.
Fish & Wildlife Habitat	Provide a healthy pasture/meadow habitat.	Provide wetland habitat.	Same as B. In addition, create or improve other habitat depending on water levels available.	Same as B.
		Plant trees for habitat needs and dike stability.	Same as B.	Same as B.
		Use prescribed fire or water fluctuations to manage vegetation and create habitat diversity.	Use some vegetation management, such as prescribed fire, livestock grazing, water fluctuations, to create habitat diversity. Use prescribed fire or water fluctuations to manage habitat.	Same as C.

Table S-1. Summary of Management Actions

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Fish & Wildlife Habitat (Continued)		Re-create meanders in Wood River and/or Sevenmile Creek for fish and wildlife habitat.	Same as B.	Allow meanders to develop within the widened floodplain/riparian zone along Wood River and Sevenmile Creek to increase fish and wildlife habitat diversity.
		Place large woody structures along river/creek banks.	Same as B.	Same as B. Develop nest islands and/or upland areas for waterfowl nesting.
Recreation Resources	Close to motorized vehicles.	Limit motorized vehicles to designated roads.	Same as B.	Same as B.
	Provide minimal recreation facilities for resource protection.	Develop some recreation facilities (parking, trails).	Develop maximum recreation facilities (parking, trails).	Develop low to moderate recreation facilities (parking, trails).
	Provide non-motorized recreation experience opportunity.	Provide roaded natural recreation experience opportunity.	Provide rural recreation experience opportunity.	Same as B.
		Coordinate hunting and fishing with ODFW. No shooting in safety zones.	Coordinate hunting and fishing with ODFW; most restrictive. No shooting in safety zones.	Monitor and coordinate hunting and fishing with ODFW based on results of monitoring data.
	Identify as Watchable Wildlife site.		Designate as Special Recreation Management Area (SRMA) and as Watchable Wildlife site.	Same as B.

Table S-1. Summary of Management Actions

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Special Areas	Do not designate as an ACEC.	Designate as an ACEC.	Same as B.	Same as B.
Cultural Resources	Conduct class I inventory. Prior to any surface disturbing activities conduct class III survey of site.	Same as A.	Same as A.	Same as A.
Roads and Facilities	Recognize existing Rights-of-way.	Same as A.	Same as A.	Same as A.
	Property to remain closed to motor vehicles.	Motorized vehicles limited to improved roads (south).	Motorized vehicles limited to improved roads (south, east, and west).	Motorized vehicles limited to designated, signed road.
	Maintain dike roads	Same as A. Improve south dike road.	Same as A. Improve roads (south, east, and west).	Same as A. Improve south dike road to the Wood River Bridge. Relocate east and west dike roads to new dikes.
	Maintain existing facilities to sustain current livestock operations.	Remove some existing facilities, although pumps and pumphouse could be maintained.	Same as B.	Same as B.
Mineral Resources	No surface occupancy for mineral and energy leases. Withdraw (close) to locatable mineral entry if mineral estate acquired in the future.	Same as A.	Same as A.	Same as A. Work with the private mineral estate owner to prevent mineral activity from conflicting with other management goals.

Table S-1. Summary of Management Actions

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Livestock Grazing	Continue existing grazing practices. Restrict grazing in riparian areas and Wood River Marsh.	No grazing.	Use livestock grazing as management tool to support the primary goal of wetland restoration.	Same as C.
	Develop allotment management plan.	No grazing.		
Fire Management	Establish initial attack agreement with Winema National Forest, U.S. Fish and Wildlife Service, and/or Oregon Department of Forestry.	Same as A. In addition, use prescribed fire as tool to achieve management objectives.	Same as B.	Same as B.
Noxious Weeds	Follow integrated noxious weed management program and Environmental Assessment	Same as A.	Same as A.	Same as A.

Table S-2. Summary of Effects

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Air Quality	No significant long-term effects.	Same as A.	Same as A.	Same as A.
Effects on Water Resources	Water quality would continue to deteriorate from sediment input and nutrient loading.	Modest improvement in water quality.	Greatest improvement in water quality.	Slightly less water quality improvement than under C, but more than B.
	Sedimentation and fecal pollution from livestock would continue to degrade water quality.	Significant decrease in livestock-related impacts on water quality compared to A.	Same as B.	Same as B.
	Insignificant effects (sedimentation) from recreation activities.	Minor effects from recreation activities.	Greatest effects from recreation activities.	Effects from recreation activities would be greater than B and less than C.
	Increase in water storage would not be realized.	Greatest increase in water storage and net decrease in water use from creation of wetlands is possible.	Moderate increase in water storage and net decrease in water use is possible.	Same as C.
Steam Channel Restoration	Wood River and Sevenmile Creek would remain channeled and sedimentation would continue. Continued dredging would negatively affect channel and riparian function.	Short-term sedimentation and nutrient impacts from stream channel restoration options.	Same as B, except less severe impact because less area would be disturbed.	Same as C.

Table S-2. Summary of Effects

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Stream Channel Restoration (Continued)	Groundwater recharge and flood flow retention would remain the same.	Groundwater recharge and flood flow retention would improve.	Same as B, except to a lesser extent.	Same as B.
Wetland Restoration	Benefits from wetland restoration would not be realized.	Short-term nutrient reduction would occur.	Same as B.	Same as B.
	Amount of shallow water wetland habitat would remain constant.	Moderate increase in shallow water wetland habitat (compared to A).	Greatest increase in shallow water wetland habitat.	Moderate increase in shallow water wetland habitat (more than B, less than C).
Effects on Wetland Vegetation	Proportion of wetland and upland vegetation would remain constant. Main property's interior would remain dominated by pasture grasses, annual forbs, and weedy species.	There would be an increase in the abundance and diversity of native wetland species, and a decrease in the levels of introduced and native upland species.	Greatest diversity in wetland vegetation.	Greater diversity in wetland vegetation than under A and B, but less than under C.
Effects on Soils	Soil would continue to subside and leach organics and nutrients into Agency Lake causing long-term decrease in soil productivity.	Soil productivity would increase compared to A.	Same as B.	Same as B.

Table S-2. Summary of Effects

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Effects on Soils (Continued)	Grazing would continue to cause minor sedimentation and compaction effects.	There would be short-term compaction, displacement, and sedimentation from construction activities.	Same as B, except more severe effects.	Same as B.
Effects on Fish and Wildlife Habitat (Including Special Status Species)	Continued periodic dredging on the Wood River would continue to degrade fish habitat components, such as for spawning.	Restoration of natural stream channels would result in a significant increase in quantity and quality of habitat.	Restoration of natural stream channels would result in a moderate increase in quantity and quality of habitat.	Same as B.
	Habitat diversity would be the lowest under this alternative.	Habitat diversity would be greater than A.	The greatest level of habitat diversity would result.	Level of habitat diversity would be more than B, less than C.
	Meadow communities with short and tall vegetation would continue to dominate the area favoring wildlife species that prefer these types of habitat.	Species that prefer meadow communities, and their predators, would be adversely affected by a decrease in percentage of this type of habitat.	Effects on wildlife species would be moderated due to the variety of habitats.	Same as B.
	Habitat diversity would remain the same as wetland habitat would not be created.	Establishment of deep water marsh habitat would have a positive effect on species that prefer this type of habitat.	Same as B.	Same as B.
	The amount of neotropical migrant bird habitat would remain the same as planting of shrubs and trees on dikes would not occur.	Planting of shrubs and trees on dikes would benefit neotropical migrant birds.	Same as B. A great number and variety of habitat developments are proposed resulting in greater benefits than Alternative B.	The widened riparian zones/floodplains along with the creation of new levees, provide the greatest increase in neotropical migrant bird habitat.

Table S-2. Summary of Effects

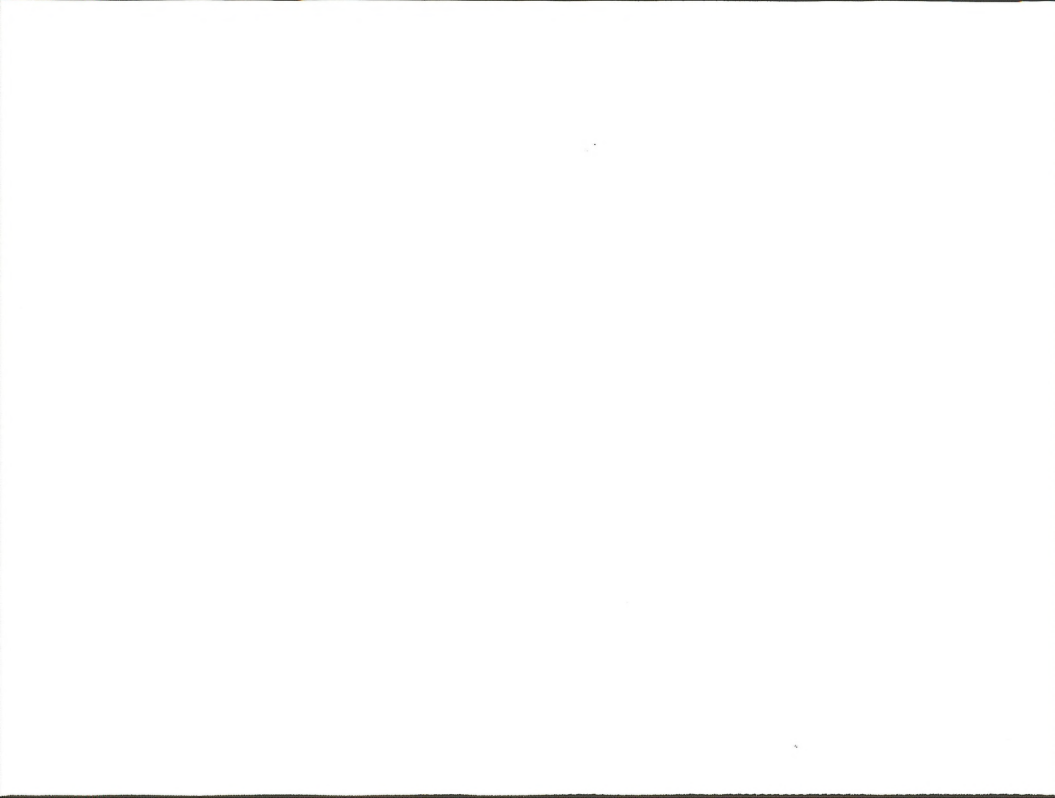
Resource	Alternative A	Alternative B	Alternative C	Alternative D
Effects on Fish and Wildlife Habitat (Including Special Status Species) (Continued)	Increased recreation would have the greatest adverse impact on neotropical birds.	Increased recreation use and motorized vehicle traffic would have some impact to wildlife through disturbance.	The greatest recreation use is anticipated under this alternative, causing the most impact to wildlife through disturbance.	Wildlife disturbances from recreation use would be greater than B, but less than C.
	Habitat diversity would remain the same as prescribed fire would not be used.	Use of prescribed fire could benefit wildlife species by providing more natural ecosystem processes and habitat diversity.	Same as B, except fire would be used more intensely.	Same as B.
Effects on Recreation Resources	Small increase in number of visitors due to public ownership.	More visitors than under A due to the development of facilities and opening the property to vehicle use.	Greatest amount of visitors due to the level of facilities development and improved roads.	Similar to A. Amount and type of facilities provided will be limited.
	Area restricted to non-motorized recreation would benefit those people seeking more primitive opportunities, but would adversely affect those people seeking motorized opportunities. Conflicts between hunters with easements and those without are occurring.	Some motorized access would have a negative effect on those people seeking primitive opportunities, but would benefit those people seeking motorized opportunities.	Motorized vehicle opportunities would be the greatest under this alternative and would benefit those people seeking motorized opportunities. Greatest adverse effect on those seeking primitive opportunities.	Similar to A. Amount of access and effect on users will depend on the results of use levels.

Table S-2. Summary of Effects

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Effects on Recreation Resources (Continued)	No speed restrictions would be sought for boats, so the least adverse effects on boaters would occur under this alternative.	Creation of meanders in Wood River would affect boaters by decreasing their speed and increasing the length of river to boats. Speed and wake limits could be imposed.	Same as B. Speed and wake limits would not be imposed.	Same as B.
Effects on Visual Resources	Visual resources would remain highly modified, and would not improve.	Greatest level of long-term improvement to visual resources. Moderate levels of short-term adverse effects on visual resources from restoration activities.	Moderate level of long-term improvement to visual resources. Greatest level of short-term adverse effects from restoration activities.	Higher level of long term improvement than C, but less than B. Short-term adverse effects would be less significant than B or C.
Effects on Cultural Resources	Least potential negative effect on cultural resources.	Moderate potential negative effect on cultural resources resulting from proposed projects. Discovery of new sites would enhance knowledge base of regional cultural resources.	Highest potential negative effect on cultural resources resulting from proposed projects. Same as B, but potential for discovery would be greater.	Low potential negative effects resulting from proposed projects. Same as B.

Table S-2. Summary of Effects

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Effects on Livestock Grazing	<p>Continuation of livestock grazing would have a positive effect on revenues to the government and livestock producers.</p> <p>Grazing use at a maximum of 3,600 AUMs per year.</p>	<p>There would be a decrease in revenue to the government and livestock producers from the elimination of livestock grazing.</p>	<p>There would be a decrease in revenues to the government and to livestock producers from using livestock grazing as a vegetation management tool and restricting grazing use to a maximum of 750 AUMs in any year that grazing is allowed.</p>	<p>There would be a decrease in revenues to the government and to livestock producers from using livestock grazing as a vegetation management tool and restricting grazing use to a maximum of 1,500 AUMs in any year that grazing is allowed.</p>
Effects on Socioeconomics	<p>Grazing use would be a maximum of 6,500 AUMs per year. The level of grazing use would generate approximately \$94,000 of gross agricultural sales, 1.5 jobs, and \$19,250 of personal income.</p> <p>Recreations contribution to the local economy would be the lowest under this alternative.</p>	<p>No livestock grazing would occur on the property consequently there would be no economic contribution from livestock grazing.</p> <p>Recreations contribution to the local economy would be higher than Alternative A, but lower than Alternative C.</p> <p>The need for 1 to 2 additional full time employees to manage the property would be created under this alternative. Annual salaries would be approximately \$35,000 each.</p> <p>Approximately \$750,000 would be spent to accomplish identified stream and wetland restoration activities.</p>	<p>The level of grazing use would generate approximately \$19,000 of gross agricultural sales and \$4,000 of personal income.</p> <p>The economic contribution from recreational activities would be the greatest under this alternative.</p> <p>Additional employment and wetland restoration expenditures are the same as Alternative B.</p>	<p>The level of grazing use would generate approximately \$38,000 of gross agricultural sales and \$8,000 of personal income.</p> <p>Recreation's contribution to the local economy would be about the same as Alternative B.</p> <p>Additional employment and wetland restoration expenditures are the same as Alternative B.</p>



Chapter 1

Introduction

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Location

The Wood River property is part of the upper Klamath Basin. The upper Klamath Basin encompasses approximately 4,630 square miles in northern California and southern Oregon (Klamath County) (Klamath Basin Water Users Protective Association 1993). Upper Klamath and Agency lakes; and Williamson, Sprague, Lost, and Klamath rivers are the major hydrologic features in the basin. Agricultural practices include row and field crops and cattle grazing. Most aspects of the principal water management issues for the upper Klamath Basin, including legal rights to the use of water in the basin, are addressed in the Bureau of Reclamation's Biological Assessment for the Long-Term Operation of the Klamath Project (USBR 1992).

The Wood River property is approximately 3,220 acres, located almost 25 miles north of Klamath Falls, Oregon (see Map 1) and approximately 15 miles from the nearest BLM-administered land within the Klamath Falls Resource Area. It is bounded on the south by Agency Lake, on the east by the Wood River and associated marsh, on the north-northwest by a dike, and on the west by the Sevenmile Creek. The property is divided east to west by a canal (see Map 2 in Chapter 2). The halves are referred to in this document as the north half and the south half. Approximately 280 acres are flooded marsh, 380 acres are upland habitat, and the remainder of the property is flood-irrigated pasture which was converted from the historic lake shore and delta by diking. Further description of the property can be found in Chapter 2, the Affected Environment.

Purpose and Need for Action

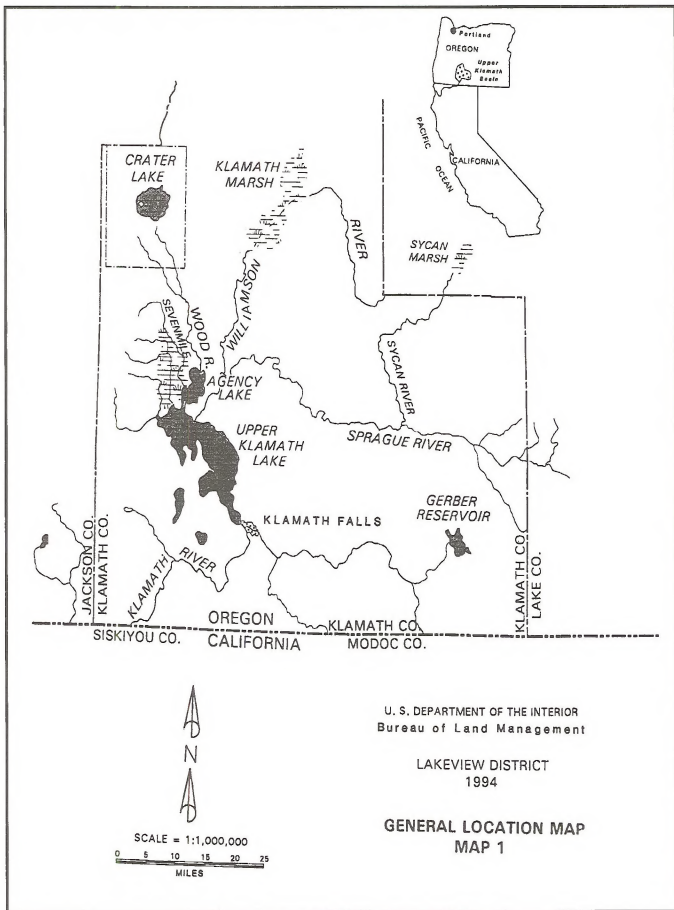
Over the last two decades wetlands have become widely recognized as an important component of the ecosystem for their role in improving water quality, reducing flooding, providing important fish and wildlife habitat, groundwater recharge, and many other important functions. Yet annual net wetland losses in the U.S. during the 1980s totaled more than 2.6 million acres (Frayer 1991).

In the Klamath Basin, wetlands have been reduced from over 350,000 acres prior to 1905 to less than 75,000 acres today due to agricultural conversion, urbanization, and other human-induced changes to the landscape (USBR 1992). See Chapter 2, Water Quality section for more information on wetland losses in the upper Klamath Basin. In an attempt to reverse this trend, the Klamath Basin Water Resources Advisory Committee solicited the Congress to appropriate funds to purchase the Wood River property for the purpose of wetland restoration.

In September 1992, the Congress appropriated \$1.3 million for the Bureau of Land Management (BLM) to purchase the Wood River property. The entire property was appraised at \$2.04 million. To facilitate the purchase, the American Lands Conservancy purchased the property until the BLM was able to complete the purchase. In July 1993, the BLM completed purchase of the south half of the property, and in July 1994 purchase of the north half was completed with additionally appropriated Congressional funds. This environmental impact statement (EIS) analysis area covers future management of the entire parcel. This EIS provides an overview of land water and related resources in the upper Klamath Basin, with specific management direction for the Wood River ranch property.

Newly acquired lands in this area will be managed for consistency with management objectives for nearby BLM-administered land. If lands with unique or fragile resource values are acquired, BLM would protect or enhance those values until the next plan revision.

In the Congressional appropriation, the BLM was directed to "consult with the Bureau of Reclamation and U.S. Fish and Wildlife Service with regard to common management issues affecting the Klamath Basin, and to dispose of appropriate land in Klamath County to compensate for tax revenue loss". Environmental analysis of the disposal actions are not



included in this document; rather they are being analyzed by the Klamath Falls Resource Area through a separate NEPA process concurrent with this process. Although no management guidance was specified, through discussions with the Bureau of Reclamation, U.S. Fish and Wildlife Service, Klamath County Commissioners, Klamath Basin Water Resources Advisory Committee, and others, it was agreed that the intent of the purchase was to restore the property to a wetland.

Because restoration of the property to wetlands could significantly affect the natural and human environment (such as improving water quality), it was determined that an environmental impact statement was needed. This resource management plan/environmental impact statement (RMP/EIS) proposes several methods (alternatives) and examines the associated impacts whereby the wetlands conversion could be completed. The goal statement, developed for management and restoration of the property, is discussed in the Long-Term Management Goals and Objectives section of this chapter.

It is possible that additional lands could be acquired in the same general area for the same basic purpose. Should that occur, newly acquired lands in this area will be managed for consistency with management objectives for nearby BLM-administered land. If lands with unique or fragile resource values are acquired the BLM would protect those values until the next plan revision.

Relationship to Other Documents

The option for acquiring the Wood River property was made available after a Draft Resource Management Plan/Environmental Impact Statement (RMP/EIS) for the Klamath Falls Resource Area (KFRA) was published (August 1992). This property is approximately 25 miles from other BLM-administered land in the KFRA. Because of the timing of the acquisition and the location of the property, the BLM decided to prepare this RMP/EIS, which is equal to, but separate from, the RMP/EIS for the rest of the Resource Area. This document is and will be consistent with the decisions made in that other RMP/EIS. The Record of Decision (ROD) for this plan will be released after the Record of Decision for the resource area's Resource Management Plan is completed. In future resource management planning, both areas may be included in one planning document.

In 1987, the BLM completed a ROD for its *Northwest Area Noxious Weed Control EIS*. Similarly, in 1991 the BLM completed a ROD for the *Vegetation Treatment on BLM Lands in Thirteen Western States*. This Resource Management Plan/Environmental Impact Statement is tied to those EISs. The decisions made and analyses of impacts contained in those RODs are not addressed again in this RMP/EIS's alternatives.

The KFRA completed a decision record for the Integrated Weed Control Plan and Environmental Assessment (OR-014-93-09) in July of 1993. The site-specific effects of noxious weed control on KFRA lands in Klamath County, including the Wood River property, are analyzed in that document. Copies of the environmental assessment are available at the Klamath Falls BLM office.

Animal damage control activities on BLM lands in the Lakeview District have been analyzed and addressed in the Record of Decision for the *Animal Damage Control Program draft Environmental Impact Statement* (1994) and the 1989 Lakeview District Animal Damage Control Environmental Assessment (OR-010-89-006). The decisions made by these documents are tied to and the effects of this program will not be reanalyzed in this document. In addition, the Animal and Plant Health Inspection Service, Animal Damage Control section has more recently prepared an environmental assessment titled "Wildlife Damage Management in the Roseburg ADC District in Southwestern Oregon including the counties of Coos, Curry, Douglas, Deschutes, Jackson, Josephine, Klamath, Lake, and Lane". The BLM was a cooperating agency during the preparation of this document. A final decision on this program action is expected in early summer 1995. When issued, this decision and environmental assessment will supersede the 1989 "Lakeview District Animal Damage Control EA" and Decision Record. This expected decision and review of associated program impacts will not be addressed further with this RMP.

Consistency with State, Local, Tribal, and Other Federal Plans

Planning regulations of the BLM require that resource management plans be consistent with officially approved or adopted resource-related plans, and the policies and procedures therein, of federal agencies, state and local governments, and Indian tribes, so long as the RMPs are also consistent with applicable federal laws and regulations. The BLM has compared the Proposed Action of this proposed RMP with plans from other agencies. This alternative appears to be consistent with all such plans, policies, and procedures. All such entities will be provided an opportunity to review this plan and provide comment on its consistency with their plans.

Planning Process

The EIS portion of this document is an analytical tool to assist the BLM staff in developing a resource management plan as prescribed by the Federal Land Policy and Management Act of 1976. The procedure for preparing a resource management plan involves nine steps: (1) identification of issues; (2) development of planning criteria; (3) inventory data and information collection; (4) analysis of management situation; (5) formulation of alternatives; (6) estimation of effects; (7) selection of a preferred alternative (including publishing a draft and final EIS); (8) selection of the proposed action; and (9) monitoring and evaluation. The resulting plan will be a decision document designed primarily to help district and area managers make decisions, guide the efforts of staff on a day-to-day basis, and to provide a basis for budget proposals.

Preparation of this RMP/EIS was initiated in November 1992 with the identification of the issues (step 1). The publication of this Proposed RMP/Final EIS is part of step 7 in the process. Public comments were received and incorporated into the draft RMP/EIS (Published in March 1994). This document proposes revised actions. A Record of Decision will be published following Governor and public comment, and resolution of any protests. After plan implementation

begins, monitoring and evaluation will occur (step 9) on a continual basis to ensure that the issues were addressed correctly and that the intended results (of the Record of Decision) are being accomplished.

Public involvement and consultation with the Klamath Tribes and affected agencies is required at several steps in the RMP process. To ensure the best possible plan, the KFRA initiated public involvement and consultation at the start of the planning process and has continued throughout the process.

Public Involvement

The Wood River acquisition was initiated by the public and the Klamath Basin Water Resources Advisory Committee, who solicited the Congress in the fall of 1992 to appropriate funding for the BLM to purchase the property. Since then, public involvement has been an integral part of the Wood River planning process.

In January of 1993, the BLM held scoping meetings of an interagency team and members of the public. The U.S. Fish and Wildlife Service, Bureau of Reclamation, U.S. Geological Survey, U.S. Environmental Protection Agency, Klamath Tribes, Oregon Department of Water Resources, and Oregon Department of Fish and Wildlife are cooperating agencies in the preparation of the Resource Management Plan/Environmental Impact Statement.

Public involvement has been stressed throughout the development of this plan. To date public involvement has included information mailers, public meetings, field trips, distribution of planning documents, document review and comment periods, informal contacts, and group meetings to share information, and the development of the Wood River Wetland Team concept (see the Wood River Wetland Team section). Comments, both written and oral have been encouraged and considered throughout the development of this plan. Comments received throughout this process have been considered in Appendix A (Comment/Responses). Each portion of this document has been reviewed by the Wood River Wetland Team participants at least once prior to its publication.

The Klamath Tribes are a sovereign dependent nation and their participation is on a government to government basis. Due to the sensitive nature of cultural resource information, the Klamath Tribes will determine what is in their best interests regarding information sharing.

After the draft plan was released, the Wood River Wetland Team assisted the BLM in analyzing the comments that were received during the "official" comment period. This comment period started on March 1, 1994, and ended on May 31, 1994. An eighteen day extension of that comment period was granted to further facilitate public participation in the Wood River project. The extended comment period ended on June 17, 1994. Since that time, the Wood River Wetland Team has been active in helping the BLM in its updating, refining, and clarifying of the language contained in the RMP/EIS.

Between the draft and final EISs, the Wood River Wetland Team again had the chance to review each of the chapters at least once. Comments received as a result of these reviews were again considered and changes made when appropriate. Where changes were deemed inappropriate; inconsistent with the goals of the project, law, BLM policy, or other guidelines; or unsupported by scientific data the BLM has tried to answer or respond to those in comments in the comment/responses appendix (see Appendix A).

Wood River Wetland Team

In the spring of 1993, the BLM formed an interdisciplinary, interagency team, called the Wood River Wetland Team (WRWT), to assist with planning for and management of the Wood River property. The team is open to anyone who is interested in participating and is intended primarily to provide an additional avenue of input and discussion during the management of this property. Members include federal, state, and local government agencies; the Klamath Tribes; interest groups; neighboring landowners; and other interested individuals. A list of the Wood River Wetland Team participants is included in Chapter 5.

The Wood River Wetland Team met 18 times between January of 1993 and May of 1995. Attendance varied widely between meetings, with new members participating throughout the process. The Wood River Wetland Team reviewed all portions of the document, and provided comments that were considered throughout the development of the entire plan. The BLM has been careful to inform the group that management decisions will be made by the BLM for the Wood River property. The Wood River Wetland Team will continue to meet and provide comments on proposed project implementation and

monitoring outlined in the plan. Long term management goals and objectives for the Wood River Property developed by the Bureau of Land Management with input from the Wood River Wetland Team are discussed later in this chapter.

Planning Criteria and Issues

Administration of the BLM is guided primarily by the Federal Land Policy and Management Act (FLPMA) of 1976 (90 Stat. 2742 USC 1701). Major provisions of FLPMA include: under the principles of multiple use and sustained yield, the BLM has broad management responsibility over federal lands; comprehensive resource management planning will be accomplished to properly use the lands and the resources they contain; management activities will strive to protect scientific, scenic, historical, ecological, environmental, air and atmosphere, water, and archaeological values.

In addition to this overall policy, other state and federal laws and policies also direct and constrain management of specific resources and activities in the Wood River property area; some of the major laws and policies are listed below:

American Indian Religious Freedom Joint Resolution of 1978
Archaeological & Historical Preservation Act of 1974
National Environmental Policy Act of 1969
Executive Order 11514 — Protection and Enhancement of Environmental Quality
Land and Water Conservation Fund Act of 1974
Taylor Grazing Act of 1934
Mining Law of 1872
Mineral Leasing Act of 1920, as amended
Mining and Minerals Policy Act of 1970
Geothermal Steam Act of 1970
Executive Order 11644 — Use of Off-Road Vehicles on the Public Lands (1972)
Antiquities Act of 1906
Historic Sites Act of 1935
Historic Preservation Act of 1966, as amended
Executive Order 11593 — Protection and Enhancement of the Cultural Environment
Archaeological Resource Protection Act of 1979
Endangered Species Act of 1973
Fish and Wildlife Coordination Act of 1958
Sikes Act of 1974
Soil and Water Resources Conservation Act of 1977
Executive Order 11990 — Protection of Wetlands
Executive Order 11988 — Protection of Floodplains

Clean Water Act of 1977
 Oregon Land Use Act of 1973
 National Wild and Scenic Rivers Act of 1968, as amended
 Clean Air Act of 1963, as amended
 Native American Graves Protection and Repatriation Act of 1992

Issues identified in the public meetings and by the WRWT include water resources (what will happen with water rights, how will water quality be improved), wetland restoration (what habitat types will be emphasized, how and when will the restoration occur), fish and wildlife habitat (which species will the BLM manage for), special status species (what will be done for endangered suckers), funding (where is funding for management of the property and research projects coming from, and is it guaranteed for the long term), economics and land tenure (how will the tax roles be equalized), recreation opportunities (will the property be open to hunting and fishing, what type of recreation facilities will be provided), access (what level of public access will be allowed), livestock grazing (will it still be allowed and if so, how much), and public involvement (what level of public involvement will occur).

Primary Issues and Effects Eliminated from Detailed Study

Mineral and energy resources were eliminated from consideration as a primary issue in the formulation of alternatives because mineral development activity is not anticipated on the Wood River property, and if it was proposed then it would be analyzed at that time. If the BLM acquired the mineral estate in the future, mineral exploration and development would only be allowed if compatible with other management goals and subject to other federal and state regulations, such as the Clean Water Act, Endangered Species Act, etc.

Other issues eliminated from study and the reasoning include: timber or woodland resources (no timber values exist on the property); wilderness areas and wild and scenic rivers (none of those areas exist on the property; see Appendix H). Use of herbicides was eliminated because this topic was fully analyzed in the BLM's 1991 ROD, *Vegetation Treatment on BLM Lands in Thirteen Western States*, and the BLM's 1986 EIS, *Northwest Area Noxious Weed Control*, as supplemented in 1987.

The following effects (environmental consequences), sometimes perceived as relevant planning topics, were eliminated from study for the reasons described: Effects on mineral resources or paleontological values (management activities are not expected to adversely or positively affect these resources); and effects on wilderness areas, wild and scenic rivers, or timber resources (none of these values or areas occur on the Wood River property).

Decision Making

The ultimate decision on all activities on the BLM-administered portions of the property are the responsibility of the BLM Area Manager of the Klamath Falls Resource Area. The Wood River Wetland Team will be provided an opportunity to review project proposals and provide input and expertise to the Area Manager on future projects, such as stream channel restoration techniques. However, the team has no decision making authority.

Monitoring the RMP

Monitoring and evaluation of the resource management plan will be carried out at appropriate intervals for the following purposes:

- * To be sure activities are occurring in conformance with the plan.
- * To determine if activities are producing the expected results.
- * To determine if activities are causing the effects identified in the environmental impact statement.

See Appendix B for more information.

Research

One of the identified purposes of monitoring, to determine if activities are causing the effects expected, can only be answered by structured research. Much relevant research is already ongoing, funded by both the BLM and other agencies and parties.

Current environmental concerns in the Klamath Basin are complex in scope and involve watershed management, reservoir operation, downstream power and fisheries, wetlands and wildlife refuge, and irrigation return flow issues. A partial list of research ongoing in the basin includes:

- * Bureau of Reclamation, Denver Office: S. Campbell, J. Sartoris, and D. Sisneros, Research projects "Basin-wide Optimum Aquatic Resource Management" and "Wetlands Ecology and Utilization," 1989 to 1995.
- * Bureau of Reclamation, Klamath Project Office: Contracted Studies with Oregon State University, D. Markle, "Fishery studies in Upper Klamath Lake and investigation of entrainment of endangered species in irrigation delivery systems," 1990 to present; and with U.S. Geological Survey, Portland Office, M. Fretwell, G. Bortelson, and M. Darling, "Assessment of nutrient loading to Upper Klamath Lake, Oregon," 1992 to 1995.
- * U.S. Geological Survey, Sacramento Office: S. Sorenson, "Investigation of Water Quality, Bottom Sediment and Biota Associated with Irrigation Drainage in the Klamath Basin, California and Oregon," 1988 to 1993.
- * Klamath Tribes, Chiloquin, Oregon: J. Kann, "Studies on reservoir water quality and nutrient loading estimates in Upper Klamath and Agency Lakes, the Williamson, Sprague, and Wood River watersheds," 1987 to present.

Coordination of activities to prevent duplication of effort is of paramount importance to all agencies/parties involved in research in the Klamath Basin, because much of the funding is supplied from the federal government budget and is limited.

Adaptive Management

Adaptive management, the process of changing land management as a result of monitoring or research, will be applied to this property throughout the life of this plan. Adaptive management is a dynamic process that consists of action-based planning, monitoring, researching, evaluating, and adjusting as necessary.

Requirement for Further Environmental Analysis

According to the National Environmental Policy Act (NEPA) new and future project proposals that are different from the proposed action of this RMP/EIS would require site-specific environmental analysis and documentation (including categorical exclusion, administrative determination where appropriate, and/or an RMP conformance determination) for each action or type of treatment under consideration. As detailed plans are developed for some of the management actions (such as ground disturbing activities) site-specific environmental analysis and documentation could also be required.

Where these actions would be accomplished by a contractor, the environmental analysis would be the primary means for determining appropriate contract stipulations. Where the actions would be accomplished by BLM personnel, the environmental analysis would be the primary means for determining how the action would be conducted.

Interdisciplinary impact analysis would be tiered to the framework of this and other applicable NEPA documents. Tiering is used to prepare more specific documents without duplicating relevant parts of previously-prepared general documents. The more specific environmental analysis can not lead directly to a change in the decisions resulting from the more general environmental analysis to which it is tiered. It could, however, result in some interim management direction pending plan revision, or a proposal to amend the plan. If an environmental assessment

indicates potential for significant impacts that are seriously different from those described in an existing EIS, a supplement to that or another EIS, or a new EIS could be required.

Specific proposals for management of competing vegetation or noxious weed control would be tiered to the BLM's Records of Decision (ROD) for the 1991 Final EIS, *Vegetation Treatment on BLM Lands in Thirteen Western States* and the 1986 EIS, *Northwest Area Noxious Weed Control Program*, as supplemented in 1987; and/or the 1993 *Klamath Falls Integrated Weed Control Program and Environmental Assessment*. In addition, the Animal and Plant Health Inspection Service, Animal Damage Control section, has more recently prepared an environmental assessment titled "Wildlife Damage Management in the Roseburg ADC District in Southwestern Oregon Including the Counties of Coos, Curry, Douglas, Deschutes, Jackson, Josephine, Klamath, Lake, and Lane". The BLM was a cooperating agency during the preparation of this document. A final decision on this program action is expected in early summer 1995. When issued, this decision and EA will supersede the 1989 "Lakeview District Animal Damage Control EA" and Decision Record. This expected decision and review of associated program impacts will not be addressed further within this RMP.

Environmental assessments (EAs) would be made available for public review in at least one of the following ways:

- * Publishing upcoming EAs in the EA register (also available in the KFRA office).
- * Advertising EAs in newspapers
- * Upon request
- * News releases
- * Maintenance of mailing list to notify individuals/agencies of availability of EAs

Long-Term Management Goals and Objectives

The primary goal for management of the Wood River property that was identified by the WRWT (with participation of the Bureau of Reclamation and the U.S. Fish & Wildlife Service as specified by the Congress) would be to restore the majority of the Wood River property to a functioning wetland community. The primary objectives would be to improve

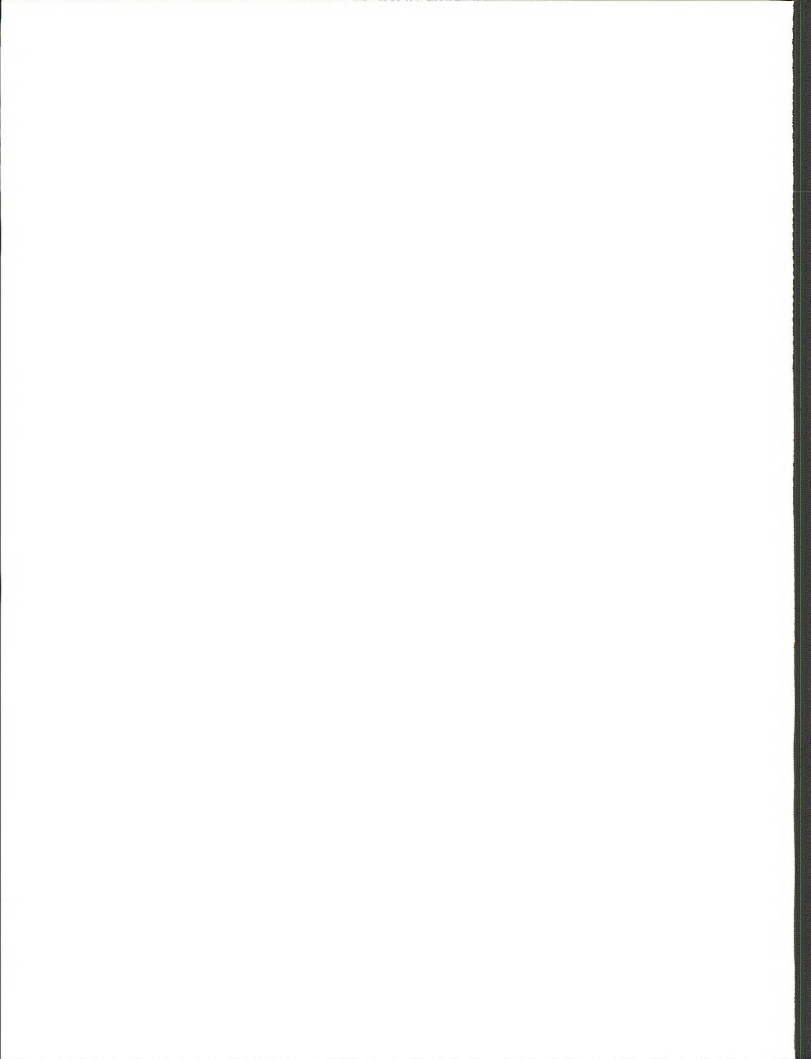
water quality and quantity entering Agency Lake from the property; and to restore and enhance wetland habitat, primarily for Lost River and shortnose suckers, and secondarily for other species.

The following additional objectives would be pursued in accordance with the primary goal and objectives. Provide for public recreation (including hunting and fishing) and environmental education. Coordinate multi-agency research and adaptive management that determines the effects of wetland restoration on water quality, seasonal water regimes, water storage, and Lost River and shortnose sucker habitat on the Wood River property. Assist in the dissemination of research results. Provide leadership and coordination during the comprehensive planning process in partnership with interested local, state, and federal agencies; landowners; and organizations to address ecosystem goals and to gain support on strategies and actions for restoring the Wood River ecosystem.

Results of the planning and management of the property would be used to coordinate with ongoing groups, projects, and studies regarding basin-wide issues. These groups include the Sucker Working Group, Research Coordination Group, Sucker Recovery Group, and the U.S. Fish and Wildlife's Klamath Basin Ecosystem Restoration Office.

Subsequent Chapters

The following chapters include a discussion of the Affected Environment (Chapter 2), Descriptions of the Alternatives (Chapter 3), Environmental Consequences (Chapter 4), and Consultation and Coordination (Chapter 5). See the User's Guide at the beginning of the document for a brief description of the contents of each chapter. The document also includes Appendices, Index, Bibliography, and Glossary to aid the reader in using this RMP/EIS.



Chapter 2

Affected Environment

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Summary of Major Changes

New information was incorporated to update many sections, including the Topography and Geology, Recreation, and Socioeconomic sections.

Introduction

This chapter describes the physical, biological, and socioeconomic characteristics of the Wood River property in the upper Klamath Basin. This property, as described in Chapter 1 and shown on Map 2 later in this chapter, is divided in half by a dike, referred to as the north half and south half; however, the descriptions given in this chapter are for the property as a whole. A combination of past and present conditions are described to aid the reader in understanding current and historic conditions and uses of the property. Where relevant, the descriptions include: historic use and conditions; recent private ownership use and conditions, and current BLM interim management use and conditions.

These descriptions should also aid the reader in understanding the changes that have already occurred or will occur as a result of the alternative management actions described in Chapter 3. Finally, these descriptions also serve as a baseline for analyzing and determining the effects on resources (see Chapter 4) from the various management alternatives.

The first two sections of this chapter describe the climate, topography, and geology of the upper Klamath Basin, which provides a general setting for the description of the other characteristics of the affected environment.

Climate

The climate in the basin is semiarid, with warm, dry summers and cool, moist winters. Average annual precipitation ranges from 10 to 15 inches. Precipitation is unevenly distributed throughout the year. Forty-four percent of the moisture occurs in winter, 22 percent in spring, 8 percent in summer, and 26 percent in fall. Snowfall accounts for 30 percent of the moisture in this area.

A wide seasonal variation of temperature occurs. Recorded extremes in the area range from -24 to +105 degrees Fahrenheit. Diurnal temperature in January varies approximately 20 degrees; in July, the variance is approximately 40 degrees. Freezing temperatures may occur in every month of the year. The average frost-free season is approximately 126 days.

In the city of Klamath Falls, the prevailing winds are southerly from November through February, westerly from March through July, and northerly from August through October. Thunderstorms, with an occasional severe hailstorm, can occur throughout the year. Relative humidity in Klamath Falls averages 62 to 74 percent in winter, and 26 to 33 percent in summer.

Topography and Geology

The Wood River property lies at the upper end of the Klamath Basin, approximately 25 miles north of the city of Klamath Falls, Oregon (see Map 1). The 3,220-acre parcel is basically flat, with elevations ranging from approximately 4,133 to 4,141 feet above sea level on the main property's interior and up to 4,150 feet along the exterior dikes. It is bounded on the east by the Wood River and the Wood River Marsh, approximately 300 acres of permanently flooded marsh which lies outside of the diked area; on the west by Sevenmile Creek; on the north by a dike; and on the south by Agency Lake (see Map 2 later in this Chapter). The south end is diked to keep Agency Lake from flooding most of the parcel.

The property has been lowered between 2 and 5 feet in elevation over the past 50 years. The oxidation of peat soils, wind erosion, drainage, subsidence and compaction resulting from human influenced activities are the major causes of this change. A result of this change is that the property is now lower than the surface level of the bordering water bodies.

The upper Klamath Basin lies within the north-northwest trending Klamath Graben, a downthrown fault block (a body of rock bounded by one or more faults) located at the extreme northwestern margin of the Basin and Range physiographic province. The property is underlain by Quaternary-age deposits of lacustrine (lake) diatomaceous clays and silts, and

alluvial floodplain deposits of volcanic ash-rich clays, silts, and sands. The diked and drained areas, and the ponded Wood River Marsh consist of peat, muck, and diatomaceous silts. See the Soil Resources and Mineral Resources sections for further information.

Valid Existing Rights

The Wood River property is mostly unimproved (without buildings or structures), but has a bunkhouse and corrals to manage cattle on the north half. Two electric drainage pumps are located at the northeastern end of the central drainage ditch and one pump is at the southwest corner of the property.

Prior to the BLM's acquisition, adjoining landowners purchased or were given the right to use roads on the Wood River property to access adjacent properties. The Pacific Power and Light Company holds several rights-of-way for electrical distribution lines that serve pumps on the Wood River and neighboring properties. Rights-of-way for drainage canals, which border the property, and for water distribution on the property have been given to the Meadows Drainage District.

An easement (see Glossary) was given to Klamath County on November 7, 1969, to provide public boating access by canal to the Wood River and Agency Lake from Petric County Park. The Wood River and canal from Petric Park are considered public waterways, with the State Marine Board in control of speed limits.

Water Resources

Agricultural use has occurred for more than 100 years in the region, possibly dating back to 1860. Early developments by the Fort Klamath Meadows Company in the Wood River Valley occurred in the 1910s and 1920s. This development consisted of reclamation of wetlands and their conversion into agricultural lands. Total developments resulted in approximately 27,000 acres of partially reclaimed wetlands and meadowlands. Additional reclamation of marshlands around the lake for agricultural use has occurred over the last 50 years. The result of this agricultural development has led to the net loss of over 30,000 acres of wetlands around the periphery of Agency Lake, of which 23,000 acres occurred in the Williamson River Delta and the Wood River

Valley (USBR 1992). Based on aerial photographs, it appears that reclamation of wetlands took place on this property from approximately 1940 to approximately 1970.

In 1921 the Link River dam was constructed to control water levels on Upper Klamath Lake. From October 1904 to September 1921 the surface elevation of Upper Klamath Lake ranged from 4,139.93 to 4,143.08. After completion of dam construction surface level elevations have ranged from 4,136.93 to 4,143.29 on Upper Klamath Lake (See Table 1).

Numerous farms and ranches in the Fort Klamath area divert significant quantities of water out of the various streams and springs in the Wood River watershed upstream from and adjacent to Agency Lake. The natural streams in the watershed include Sevenmile Creek, Fourmile Creek, Annie Creek, Fort Creek, Agency Creek, Crooked Creek, and Wood River. Additionally, water from various natural springs is diverted to various maintained ditches which supply irrigators in the area. Bluespring, Sevenmile, and Melhase are the major ditches conveying water from the natural creeks and springs to the irrigators. Return flows from these ditches are collected into several canals that connect with and are adjacent to Agency Lake. These canals, which contain water year round, include West, Sevenmile, Central, and North canals, among others (USBR 1992).

A large amount of the water diverted to irrigation ditches from Sevenmile Creek and Wood River is recovered to the ditches as return flows, entering Agency Lake. Depending on land use practices, number of reuses and erosion, the water quality of these return flows ranges from fair to extremely poor. The nutrient-rich water entering Agency Lake contributes to blue-green algal blooms, anoxic conditions (insufficient dissolved oxygen levels), and elevated pH levels within Agency Lake, which affects the water quality of Upper Klamath Lake (USFWS 1992a). See the Water Quality section for more information.

Water Rights

Water rights are a type of property right and are attached to the land where they were established. Water rights for the Wood River property are issued to the Meadows Drainage District. The water delivered to the Wood River property comes through a system of canals and ditches operated and owned by the Meadows Drainage District. The district's water right allows for diversion of 200.5 cubic feet per

**Table 1. Upper Klamath Lake End of Month Elevations
Post Construction of Link River Dam (1921 to Present)**

	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Minimum	4136.93	4137.14	4137.41	4137.65	4138.30	4139.44	4140.09	4139.62	4139.07	4138.18	4137.42	4136.84
Average	4139.44	4138.74	4140.19	4140.63	4141.33	4141.99	4142.44	4142.44	4141.98	4140.95	4139.99	4139.49
Maximum	4141.56	4141.52	4143.67	4143.02	4142.99	4142.90	4143.20	4143.29	4143.25	4142.73	4142.34	4142.45
1994-95	4136.93	4137.80	4138.58	4140.27	4141.95							
1993-94	4139.62	4139.67	4139.94	4140.55	4141.35	4142.19	4142.12	4142.00	4140.81	4139.04	4137.52	4136.84
1992-93	4137.59	4138.32	4138.27	4140.01	4140.87	4142.65	4143.02	4143.29	4142.66	4141.49	4140.45	4139.52
1991-92	4138.18	4138.95	4139.66	4140.26	4140.97	4141.70	4142.16	4142.39	4141.51	4140.20	4138.99	4138.24
1990-91	4138.75	4139.01	4139.83	4140.47	4141.19	4141.70	4142.16	4142.07	4141.70	4140.70	4139.67	4138.94
1989-90	4139.86	4140.26	4140.58	4141.36	4141.74	4142.73	4142.73	4142.94	4143.11	4142.30	4140.94	4139.61
1988-89	4138.66	4139.90	4140.55	4141.07	4141.32	4142.47	4142.94	4143.11	4143.11	4142.86	4140.86	4139.68
1987-88	4139.12	4139.44	4140.59	4141.40	4142.04	4142.72	4142.95	4142.85	4142.45	4141.06	4139.54	4138.68
1986-87	4140.47	4140.79	4140.83	4141.45	4141.89	4142.56	4142.71	4142.22	4141.61	4141.04	4140.05	4139.33
1985-86	4140.87	4141.06	4140.65	4141.60	4142.69	4142.83	4142.83	4143.05	4142.55	4141.50	4140.41	4140.40
1984-85	4141.36	4140.90	4140.37	4140.75	4141.62	4142.84	4142.98	4142.43	4142.43	4141.23	4140.53	4140.63
1983-84	4141.40	4140.95	4140.84	4141.07	4141.71	4142.55	4142.89	4143.00	4142.97	4142.33	4141.78	4141.78
1982-83	4141.41	4141.04	4140.70	4141.09	4142.06	4142.35	4142.83	4142.92	4142.92	4142.62	4142.34	4141.98
1981-82	4138.27	4140.01	4141.81	4141.54	4142.87	4142.44	4142.63	4142.99	4143.25	4142.07	4141.60	4141.36
1980-81	4139.35	4139.74	4140.57	4141.28	4142.38	4142.84	4142.95	4142.75	4141.62	4140.06	4138.30	4137.55
1979-80	4138.36	4139.42	4140.55	4141.71	4142.20	4142.54	4143.06	4142.95	4142.55	4141.44	4140.01	4139.36
1978-79	4140.33	4140.35	4140.62	4141.18	4141.80	4142.43	4142.84	4142.69	4141.41	4140.00	4138.95	4138.18
1977-78	4139.60	4140.50	4141.10	4141.46	4141.81	4142.49	4142.89	4142.98	4142.98	4141.58	4140.54	4140.40
1976-77	4141.35	4140.77	4140.80	4140.91	4141.50	4142.89	4142.48	4142.74	4142.18	4140.76	4139.78	4139.45
1975-76	4141.41	4141.20	4140.85	4140.88	4141.25	4142.07	4142.64	4142.63	4142.23	4141.42	4141.80	4141.46
1974-75	4141.39	4141.02	4140.85	4140.83	4141.35	4142.20	4142.69	4142.97	4143.11	4142.68	4142.05	4141.63
1973-74	4139.64	4141.21	4141.54	4141.98	4142.16	4142.60	4142.73	4143.00	4142.92	4142.47	4141.88	4141.45
1972-73	4141.21	4141.06	4141.15	4141.33	4141.72	4142.31	4142.55	4142.38	4141.30	4140.08	4139.14	4139.13
1971-72	4141.26	4141.23	4140.84	4140.28	4142.05	4142.22	4142.80	4143.04	4142.97	4142.17	4141.62	4141.14
1970-71	4140.10	4140.68	4140.35	4141.18	4141.75	4142.65	4142.55	4142.96	4143.07	4142.73	4141.91	4141.78
1969-70	4140.56	4139.94	4140.78	4142.10	4142.20	4142.41	4142.96	4143.16	4142.68	4141.73	4140.45	4139.93
1968-69	4138.57	4138.53	4140.36	4141.27	4141.37	4142.39	4142.99	4143.09	4143.10	4142.16	4141.15	4140.49
1967-68	4140.23	4140.24	4139.77	4140.22	4141.78	4142.13	4141.68	4141.40	4140.39	4139.10	4138.66	4138.55
1966-67	4139.41	4139.97	4140.24	4140.41	4140.56	4141.97	4142.88	4143.04	4143.04	4141.96	4140.80	4140.18
1965-66	4140.76	4139.74	4139.58	4139.54	4140.32	4141.91	4142.38	4142.37	4142.02	4141.19	4140.07	4139.72
1964-65	4140.17	4140.74	4143.67	4143.02	4142.18	4142.18	4142.26	4142.86	4142.98	4142.50	4142.23	4142.45
1963-64	4140.03	4140.31	4139.85	4139.65	4140.15	4141.35	4142.15	4142.41	4142.79	4141.91	4141.18	4140.54
1962-63	4140.33	4140.45	4140.78	4140.63	4142.35	4142.71	4142.98	4142.91	4142.31	4141.49	4140.63	4140.03
1961-62	4138.92	4138.99	4139.51	4139.41	4140.76	4142.09	4142.77	4143.04	4142.10	4140.79	4139.98	4139.23
1960-61	4138.64	4139.53	4139.98	4140.06	4141.35	4142.40	4142.59	4142.40	4141.80	4140.38	4139.56	4139.02
1959-60	4138.54	4138.75	4138.96	4139.15	4140.40	4141.82	4142.42	4142.57	4141.50	4140.13	4139.09	4138.61
1958-59	4141.56	4141.52	4141.18	4141.21	4141.71	4141.97	4142.32	4142.47	4141.52	4139.96	4139.15	4138.54
1957-58	4140.33	4140.69	4141.06	4141.05	4142.99	4142.71	4142.32	4143.13	4143.08	4142.65	4141.83	4141.54
1956-57	4141.15	4141.11	4141.31	4141.09	4141.82	4142.62	4142.95	4143.05	4142.30	4141.14	4140.33	4139.92
1955-56	4140.04	4140.54	4142.02	4142.39	4142.99	4142.22	4141.81	4142.80	4143.12	4142.95	4141.95	4141.35
1954-55	4139.60	4139.43	4139.61	4140.15	4140.78	4141.95	4142.73	4142.61	4141.75	4140.81	4139.80	4139.51
1953-54	4139.92	4140.45	4141.30	4141.50	4142.27	4142.27	4142.81	4142.88	4142.43	4141.31	4140.45	4139.95
1952-53	4140.05	4139.94	4140.19	4142.00	4142.18	4142.38	4142.71	4143.08	4142.88	4141.81	4140.95	4140.27
1951-52	4140.10	4140.56	4141.32	4140.77	4141.01	4140.93	4142.70	4143.06	4142.95	4142.23	4141.28	4140.59
1950-51	4140.63	4140.87	4141.26	4141.73	4142.16	4142.33	4143.02	4142.82	4141.81	4140.64	4139.94	4139.54
1949-50	4139.39	4138.93	4138.35	4139.12	4140.44	4142.10	4142.72	4142.90	4142.57	4141.51	4140.62	4140.28
1948-49	4139.67	4139.87	4139.89	4139.52	4140.04	4141.59	4142.51	4142.89	4142.25	4141.23	4140.42	4139.80
1947-48	4138.27	4138.41	4138.79	4139.69	4140.10	4141.04	4142.14	4142.75	4142.56	4141.44	4140.46	4139.88
1946-47	4138.50	4138.57	4138.69	4139.04	4140.24	4141.26	4141.58	4141.27	4141.47	4140.33	4139.19	4138.40
1945-46	4137.64	4138.60	4139.96	4141.13	4141.26	4141.17	4141.79	4142.33	4141.91	4140.91	4139.57	4138.77
1944-45	4137.58	4137.76	4137.74	4138.13	4139.96	4140.70	4141.00	4142.00	4141.98	4140.67	4138.91	4138.72

Table 1. Upper Klamath Lake End of Month Elevations (continued)
Post Construction of Link River Dam (1921 to Present)

1943-44	4139.81	4139.79	4139.83	4140.08	4140.74	4141.50	4141.77	4141.52	4141.58	4140.25	4138.52	4137.63
1942-43	4138.22	4139.25	4140.86	4141.99	4141.39	4141.85	4142.84	4143.02	4142.86	4142.10	4140.37	4139.98
1941-42	4138.87	4138.96	4140.48	4141.32	4142.16	4142.62	4142.96	4142.98	4142.44	4141.25	4138.73	4138.69
1940-41	4137.80	4138.25	4139.03	4139.83	4141.04	4141.95	4142.20	4142.33	4141.95	4140.80	4139.78	4139.18
1939-40	4137.84	4138.00	4139.10	4140.27	4141.67	4142.90	4142.98	4142.53	4141.34	4139.95	4138.64	4138.12
1938-39	4136.62	4140.40	4140.90	4141.36	4141.95	4142.61	4142.34	4141.92	4140.92	4139.70	4138.34	4137.68
1937-38	4139.60	4140.34	4141.47	4142.30	4142.16	4142.59	4143.20	4142.94	4142.26	4141.27	4140.25	4139.61
1936-37	4138.94	4138.56	4138.91	4139.17	4139.73	4141.01	4142.33	4142.26	4142.40	4141.38	4140.14	4139.51
1935-36	4139.13	4139.26	4139.68	4141.22	4142.00	4142.42	4142.95	4142.97	4142.58	4141.44	4140.22	4139.57
1934-35	4138.55	4139.78	4140.66	4141.45	4142.10	4142.59	4142.85	4142.76	4142.00	4141.19	4140.07	4139.23
1933-34	4140.28	4140.71	4141.36	4141.87	4142.17	4142.78	4142.61	4142.15	4141.45	4140.22	4139.10	4138.32
1932-33	4139.77	4140.19	4140.57	4141.30	4141.45	4142.15	4142.48	4142.87	4142.50	4141.80	4141.02	4140.48
1931-32	4137.82	4138.08	4138.92	4139.74	4139.90	4141.56	4142.05	4142.81	4142.31	4141.26	4140.22	4139.63
1930-31	4137.20	4137.40	4137.41	4137.85	4138.78	4139.71	4140.09	4139.62	4139.07	4138.18	4137.42	4137.54
1929-30	4137.19	4137.14	4138.55	4138.73	4140.35	4141.12	4141.43	4140.82	4139.46	4138.49	4138.13	4137.89
1928-29	4137.39	4137.47	4137.85	4138.06	4138.20	4139.44	4140.60	4140.57	4140.41	4138.93	4137.73	4137.13
1927-28	4138.74	4139.29	4139.67	4140.35	4141.19	4141.88	4142.24	4142.10	4141.39	4140.08	4138.63	4137.83
1926-27	4137.16	4138.03	4139.33	4139.98	4141.15	4141.82	4142.25	4142.42	4141.74	4140.58	4139.41	4138.86
1925-26	4139.58	4139.72	4139.87	4140.01	4140.84	4141.30	4141.17	4140.64	4139.52	4138.45	4137.58	4136.90
1924-25	4137.47	4138.06	4138.42	4139.31	4141.30	4141.48	4142.43	4142.31	4141.83	4140.75	4139.80	4139.56
1923-24	4139.88	4140.28	4140.88	4140.35	4141.13	4141.03	4140.98	4140.41	4139.91	4139.04	4138.40	4137.77
1922-23	4139.96	4140.41	4140.64	4139.97	4139.59	4140.58	4141.93	4142.10	4141.62	4141.11	4140.02	4139.63
1921-22	4140.53	4140.79	4141.12	4141.06	4141.04	4141.12	4142.10	4141.90	4141.29	4140.52	4139.98	4139.90
Prior to Construction of Link River Dam												
Minimum	4140.35	4140.40	4140.83	4140.83	4140.93	4141.03	4141.13	4140.43	4139.93	4139.98	4140.08	4140.16
average	4140.70	4140.99	4141.32	4141.40	4141.53	4141.99	4142.06	4141.74	4141.18	4140.72	4140.47	4140.56
Maximum	4141.40	4141.73	4142.13	4142.10	4142.38	4143.08	4143.08	4142.73	4141.98	4141.55	4140.98	4141.93
1920-21	4140.90	4141.32	4141.68	4141.61	4141.73	4142.31	4141.80	4141.56	4141.03	4140.52	4140.11	4140.30
1919-20	4140.43	4140.63	4140.94	4141.00	4141.13	4141.78	4142.23	4141.88	4141.33	4140.86	4140.33	4140.42
1918-19	4140.35	4140.40	4140.90	4140.98	4141.18	4141.40	4142.00	4142.15	4141.38	4141.55	4140.18	4140.46
1917-18	4140.50	4140.53	4141.03	4141.30	4141.13	4141.35	4141.13	4140.43	4139.93	4139.98	4140.08	4140.26
1916-17	4140.38	4140.63	4140.83	4140.83	4140.93	4141.03	4141.95	4142.13	4141.38	4140.25	4140.18	4140.26
1915-16	4140.43	4140.83	4141.13	4141.13	4141.33	4142.13	4141.88	4141.13	4140.63	4140.43	4140.43	4140.33
1914-15	4140.49	4141.04	4140.98	4141.03	4141.18	4141.66	4142.25	4141.34	4140.48	4140.18	4140.19	4140.16
1913-14	4140.51	4141.11	4141.27	4141.68	4141.63	4142.20	4142.73	4141.83	4141.23	4140.56	4140.42	4140.51
1912-13	4140.66	4141.08	4141.17	4141.23	4141.03	4141.18	4142.41	4141.93	4141.38	4140.99	4140.73	4140.61
1911-12	4140.73	4140.96	4141.12	4141.50	4141.91	4141.84	4141.23	4141.53	4141.43	4140.83	4140.53	4140.88
1910-11	4140.91	4141.73	4141.93	4141.63	4141.71	4142.34	4142.68	4142.08	4141.61	4141.15	4140.95	4140.62
1909-10	4140.58	4140.78	4142.13	4141.53	4141.88	4143.03	4142.33	4141.88	4141.11	4140.72	4140.43	4140.73
1908-09	4140.85	4140.98	4141.08	4141.43	4142.06	4141.98	4141.53	4141.53	4140.98	4140.26	4140.75	4140.23
1907-08	4141.05	4141.13	4141.73	4141.88	4141.23	4141.88	4141.53	4141.63	4140.98	4140.58	4140.38	4140.58
1906-07	4140.88	4141.13	4141.28	4141.48	4142.38	4143.08	4143.08	4142.73	4141.98	4141.33	4140.96	4141.93
1905-06	4140.90	4141.00	4141.20	4141.38	4141.48	4142.58	4142.93	4142.53	4141.93	4141.13	4140.63	4140.68
1904-05	4141.40	4141.60	4142.00	4142.10	4142.10	4142.10	4141.40	4141.30	4141.20	4141.00	4140.70	4140.60

second (cfs; see Glossary) from the Wood River near Fort Klamath (where Weed Road crosses the Wood River). Of this amount, a landowner in the Drainage District could divert up to 0.0125 cubic feet per second per acre, or its equivalent for each acre irrigated, from the Wood River Canal to his/her property. Additional information on Oregon State water laws can be obtained from the Klamath County Watermaster or the State of Oregon Water Resources Department.

Wood River Ranch Water System Operations

The Meadows Drainage District delivers irrigation water and provides drainage services to much of the Wood River Valley. This district, organized according to the laws of the state of Oregon, is essential to management of water on the Wood River property. All the drainage district members cooperate in the use of water and usually coordinate diversions and irrigation deliveries informally through phone calls.

The Meadows Drainage District diverts water through the Bluespring, Sevenmile, and Melhase Ditches and collects return flows in West, Sevenmile, Central and North Canals, among others. The District provides irrigation water for approximately 20,000 acres. In addition to District water users, many individual landowners, farmers, and ranchers are provided water via these ditch systems. These landowners each irrigate from several hundred to several thousand acres. Many of these landowners (particularly the largest) irrigate pasture lands for hay and livestock production. These water diversions are taken under Oregon Water Rights; the allotments for each landowner average 3.5 to 5.0 acre feet per year (USBR 1992).

Depending on the weather and the year, ditch diversion deliveries to lands served by the Meadows Drainage District begin about mid-April and terminate in late September. The heaviest consumption and deliveries are from mid-May to mid-August, tapering off at the end of the irrigation season. Much of the water used throughout the District reenters the ditches for further use downstream and much of this return flow drains to the downstream canals which convey this water to Agency Lake. After deliveries are finished in the fall the ditches and canals are allowed to dry up during the non-irrigating season (USBR 1992). Because the Wood River property is in the farthest downstream portion of the irrigation district, its use (or non-use) of water does not adversely affect uses by other District members (Hawkins, pers. comm. 1993).

In the spring runoff period and into early summer, water is pumped off the Wood River property to drain it. This water is pumped into the Wood River and Sevenmile Canal, which flow into Agency Lake. Later in the summer (July, August) when the ground dries out, water is gravity fed onto the property for irrigation. Of the two main diversions serving the property, the greatest portion of water used for irrigation comes from the Sevenmile Canal, which contains a higher proportion of irrigation return water than the Wood River Canal (Hawkins, pers. comm. 1993). Both diversions operate by gravity head gates.

Water Quality

Upper Klamath Lake is a shallow lake, with a mean depth of approximately eight feet and a surface area of about 85,000 acres (USBR 1992). Agency Lake forms a shallow, northerly arm of Upper Klamath Lake. Historically eutrophic (see Glossary), Upper Klamath Lake has become hypereutrophic (see Glossary) (USFWS 1992a, Kann and Smith 1993). Upper Klamath Basin wetlands have been reduced from over 350,000 acres prior to 1905 to less than 75,000 acres today. It has been theorized that conversion of wetlands, which retain nutrients, to croplands has resulted in an increase of organic nutrient input to Upper Klamath and Agency lakes (USBR 1992). Excessive nutrient supply is primarily responsible for the current hypereutrophic status of the lakes. In summer and fall, nutrient input results in massive blue-green algae blooms (USBR 1992). Other proposed reasons include changes in the timing and rate of lake flushing from dam regulation, wetland and riparian losses, irrigation diversions, and hydrologic alterations from forest practices. In addition, decreases in lake level due to both regulation and irrigation releases may cause the lake to be more conducive for algal production through warmer temperatures and higher nutrient levels from decreased lake volume (USFWS 1992a). Loss of wetlands have also altered lake nutrient cycling and inputs of nutrients, as well as decreased the capacity of Upper Klamath and Agency Lakes to store water (USBR 1992).

Lake nutrient cycling and inputs of nutrients to the lake have been altered, and it has been hypothesized that, as a result, the algal community has shifted to more of a monoculture of the blue-green algae, *Aphanizomenon flos-aquae*, which is more efficient than green algae at using low concentrations of carbon dioxide. High water temperatures and nutrient cycling resulting from a lack of lake stratification (see Glossary) are favorable for blue-green algae growth. Massive blooms of algae that occur

during the summer and fall cause extremely high pH levels (pH greater than 10.0), wide fluctuations of dissolved oxygen and carbon dioxide levels, high concentrations of phosphorus, a green appearance and foul odors as the algae decays, and possibly an algal toxicity problem (Kann and Smith 1993, USBR 1992, U.S. Army Corps of Engineers 1982). Fish kills in 1971 and 1986 are thought to have been caused by water quality problems associated with the algae, such as dissolved oxygen depletion from high water temperatures and extensive algal decay (USFWS 1992a).

Water quality in Upper Klamath Lake during the summer and fall can quickly degrade to pH values in excess of 10.0 and dissolved oxygen levels as low as 0.03 milligrams per liter. On several occasions in recent years, pH levels have been above 9.5 in most of Upper Klamath Lake during the summer and early fall; in June 1992 pH levels as high as 10.5 were measured in the water leaving the lake through the A-Canal (USFWS 1992a, Kann and Smith 1993, Monda and Saiki 1993, and Kann 1993a,b).

The role of internal nutrient loading is uncertain. Studies of Upper Klamath Lake bed sediments showed that concentrations of nitrogen and phosphorus in the interstitial water (see Glossary) of Howard Bay sediment were several times higher than those near Buck Island and the lake outlet. A sediment core taken near the outlet of the lake indicated an accelerated rate of sedimentation in more recent years, possibly related to changes in the watershed and productivity of the lake (USFWS 1992a).

In 1988 the Oregon Department of Environmental Quality (DEQ) conducted an extensive inventory of water quality problems in the state, the 1988 *Oregon Statewide Assessment of Non point Sources of Water Pollution*. This report lists waterbodies where serious non point source pollution problems are known to exist, or have been reported without challenge, based on information in the DEQ assessment report. Results of the 1988 Assessment for Wood River, Sevenmile Creek, Agency Lake, and Upper Klamath Lake are listed in Table 2. Additional information on the status of water quality in the Klamath Basin and on DEQ's water quality programs is contained in the Oregon DEQ *Water Quality Status Assessment (305[b]) Report (1992)*.

A Lake Water Quality Assessment is being conducted in Upper Klamath Lake by the Klamath Tribes as part of the Environmental Protection Agency's Clean Lakes Program. The goal of this project is to assess current water quality conditions and dynamics in the lake. Specific objectives of the project are

to assess in-lake nutrient concentrations, monitor water quality parameters, and assess phytoplankton composition and biomass throughout the phytoplankton growth period; as well as to assess surface water loading of major algal-growth nutrients to Upper Klamath Lake. Data are currently being tabulated and analyzed for measured parameters (DEQ 1992).

The U.S. Bureau of Reclamation has funded a five year study to be conducted in coordination with the U.S. Geological Survey and Klamath Tribes to determine the source and relative magnitudes of nitrogen and phosphorus loading in ground and surface water discharge from natural and disturbed lands (primarily agricultural and forestry disturbances). The study will also examine the role that reservoir water surface regulation has played in moving nutrients through Upper Klamath Lake, as well as nutrient availability (USFWS 1992a).

Additional information on water quality studies and other research being conducted in the Klamath Basin can be found in *Environmental Research in the Klamath Basin, Oregon: 1991 and 1992 Annual Reports* (USBR 1993a, USBR 1993b).

Water Quantity

The idea of wetlands increasing the water storage capacity within a given watershed is not new. It is however variable depending upon a number of contributing factors such as: precipitation, surface inflows, subsurface inflows, surface outflows, subsurface outflows, and evapotranspiration. In general water is brought into the wetland during high flow (spring runoff/flooding), stored and released at a slower rate throughout the year. In general, it appears that annual evapotranspiration rates in the wetland average 80 percent of compatible losses from open water surface (Hammer 1992).

Groundwater

The Wood River property lies in the Upper Klamath Lake groundwater sub-basin in a groundwater discharge area. In groundwater discharge areas, precipitation generally does not enter the groundwater system, rather it is evaporated, transpired, or leaves as surface runoff. The aquifer for the property is comprised of pumice, sand, chalk, gravel, clay, or cinders. The groundwater table is shallow, with some artesian (free-flowing) wells, including one in the northeastern corner of the property. The Wood River Valley drains from Devil's Peak in the Sky Lakes Wilderness Area north along the crest of the Cascades to Crater Lake; southeast from Crater

Table 2. Results of the 1988 Oregon DEQ Statewide Assessment of Nonpoint Sources of Water Pollution.

Waterbody Name	Pollution Type	Severity (Info. Source)	Impacted Beneficial Uses	Probable Causes
Upper Klamath Lake	Pesticides	Severe problem (data)	-Cold Water Fisheries -Warm Water Fisheries	-surface erosion -irrigation withdrawal
	Toxics	Severe problem (data)	-Water Recreation -Aesthetics	-reservoir storage and releases -channelization/ wetland drainage
	Solids	Severe problem (observation)		
	Sedimentation	Severe problem (data)		
	Excessive Plant Growths	Severe problem (data)		
Agency Lake	Pesticides	Moderate problem (observation)	-Cold Water Fisheries -Warm Water Fisheries	-surface erosion -irrigation withdrawal
	Toxics	Moderate problem (observation)	-Water Recreation -Aesthetics	-reservoir storage and releases -channelization/ wetland drainage
	Sedimentation	Severe problem (data)		
	Excessive Plant Growths	Moderate problem (observation)		
Wood River	Turbidity	Moderate problem (observation)	-Cold Water Fisheries -Wildlife	-riparian vegetation and bank disturbance -traffic
	Low Dissolved Oxygen	Moderate problem (observation)	-Water Recreation	-flow alteration
	Nutrients	Moderate problem (observation)		
	Sedimentation	Moderate problem (observation)		
	Streambank Erosion	Moderate problem (observation)		
	Decreased Streamflow	Moderate problem (observation)		
	Insufficient Stream Structure	Moderate problem (observation)		

Table 2. Results of the 1988 Oregon DEQ Statewide Assessment of Nonpoint Sources of Water Pollution. (continued)

Waterbody Name	Pollution Type	Severity (Info. Source)	Impacted Beneficial Uses	Probable Causes
Sevenmile Creek	Turbidity	Moderate problem (observation)	-Cold Water Fisheries -Other Aquatic Life	-surface erosion -changes in flow pattern timing
	Low Dissolved Oxygen	Moderate problem (observation)	-Wildlife -Aesthetics	-elimination of thermal cover to stream
	Nutrients	Severe problem (observation)		-traffic -vegetation removal
	Solids	Moderate problem (observation)		-irrigation withdrawal
	Sedimentation	Moderate problem (observation)		-altered physical characteristics of stream
	Streambank Erosion	Moderate problem (observation)		-channelization/ wetland drainage
	Decreased Streamflow	Moderate problem (observation)		-placement of instream structures

Lake to Sand Ridge; southeast from Sand Ridge to the town of Chiloquin; then northwest from Chiloquin back to Devil's Peak (Oregon Water Resources Board 1971). The U.S. Geological Survey is in the process of conducting a groundwater study of the Agency Lake-Upper Klamath Lake area. No information has been found on the quality of groundwater in the area.

The banks of the Wood River and Sevenmile Creek are classified as riverine/lower perennial/aquatic bed/diked wetlands. Throughout this document these wetland types are referred to as riparian areas. For information regarding wetland and riparian area functions refer to Appendix C.

Wetlands/Riparian Areas

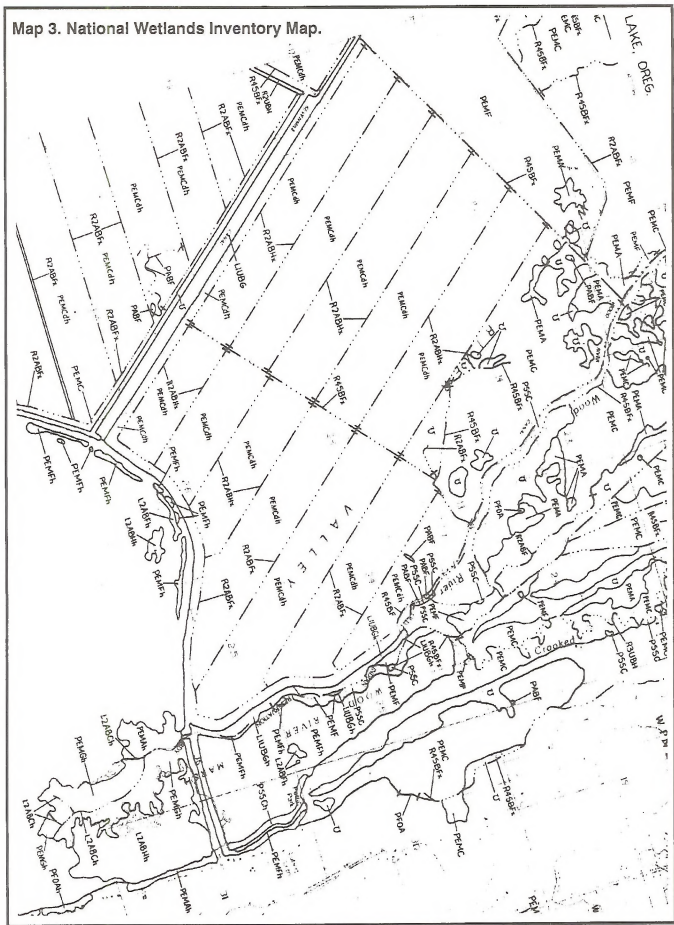
There are several types of wetland habitats that occur on the Wood River property. The classification system used to describe these habitats was established by the U.S. Fish and Wildlife Service (USFWS) and was used in mapping wetland areas for their National Wetlands Inventory. This classification system is described in *Classification of Wetlands and Deepwater Habitats of the United States* (USFWS 1979, reprint 1992b). National Wetlands Inventory maps and related information can be obtained from local USFWS or Soil Conservation Service offices. Also, see Map 3.

This classification system uses modifiers to describe the plants, soil types, and frequency of flooding that define a particular wetland habitat. These modifiers, which are a hierarchy in the classification system, are combined and used in the National Wetland Inventory Maps. The following description is a brief summary of the wetland types found on the Wood River property, as mapped by the USFWS. Definitions of the modifiers used in the following paragraphs can be found in the Glossary.

The main part of the property (north and south halves) is classified as an emergent, seasonally flooded, diked/impounded and partially drained/ditched palustrine (swamp) wetland. There are some smaller areas in the northeast corner of the property that are classified as emergent, temporarily flooded palustrine wetlands and emergent, seasonally flooded palustrine wetlands.

The Wood River Marsh is a complex of predominately three wetland types: a littoral, aquatic bed, permanently flooded, diked/impounded lacustrine (lake) wetland; an emergent, temporarily flooded, diked/impounded emergent palustrine wetland; and an emergent intermittently exposed, diked/impounded palustrine wetland. See Map 3.

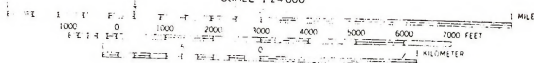
Map 3. National Wetlands Inventory Map.



Map 3. Key for National Wetlands Inventory Map.

Adapted from the U.S. Department of the Interior, Fish and Wildlife Service National Wetlands Inventory of 1989

SCALE 1:24,000

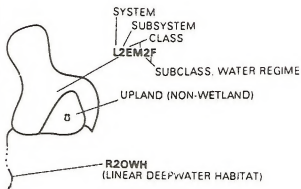


1 acre

 10 acres
ACREAGE GUIDE

20 acres

SYMBOLGY EXAMPLE



NOTES TO THE USER

- Wetlands which have been field examined are indicated on the map by an asterisk (*).
- Additions or corrections to the wetlands information displayed on this map are solicited. Please forward such information to the address indicated.
- Subsystems, Classes, Subclasses, and Water Regimes in *italics* were developed specifically for NATIONAL WETLANDS INVENTORY mapping.
- Some areas designated as R4SB, R4SBW, OR R4SBJ (INTERMITTENT STREAMS) may not meet the definition of wetland.
- This map uses the class Unconsolidated Shore (US). On earlier NWI maps that class was designated Beach/Bar (BB), or Flat (FL). Subclasses remain the same in both versions.

AERIAL PHOTOGRAPHY

- Primarily represents upland areas, but may include unclassified wetlands such as man-modified areas, non photo-identifiable areas and/or unintentional omissions

DATE: 8 / 82 DATE: _____
 SCALE: 1:58,000 SCALE: _____
 TYPE: CIR TYPE: _____

Key Continues on next page.

SYSTEM

R -- RIVERINE

SUBSYSTEM 1 -- TIDAL 2 -- LOWER PERENNIAL 3 -- UPPER PERENNIAL 4 -- INTERMITTENT 5 -- UNKNOWN PERENNIAL

CLASS	RB -- ROCK	UB -- UNCONSOLIDATED BOTTOM	*SB -- STREAMBED	AB -- AQUATIC BED	RS -- ROCKY SHORE	UG -- UNCONSOLIDATED SHORE	**EM -- EMERGENT	OW -- OPEN WATER/ Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Bedrock 2 Rubble 3 Cobble-Gravel 4 Sand 5 Mud 6 Organic 7 Vegetated	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submerged 6 Unknown Surface	1 Bedrock 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submerged 6 Unknown Surface	1 Bedrock 2 Rubble 3 Sand 4 Organic 5 Vegetated	2 Nonpersistent	

*STREAMBED is limited to TIDAL and INTERMITTENT SUBSYSTEMS, and comprises the only CLASS in the INTERMITTENT SUBSYSTEM

**EMERGENT is limited to TIDAL and LOWER PERENNIAL SUBSYSTEMS. The remaining CLASSES are found in all SUBSYSTEMS

SYSTEM

P -- PALUSTRINE

**CLASS RB -- ROCK BOTTOM UB -- UNCONSOLIDATED BOTTOM AB -- AQUATIC BED US -- UNCONSOLIDATED SHORE ML -- MOSS-LICHEN EM -- EMERGENT SS -- SCRUB SHRUB FO -- FORESTED OW -- OPEN WATER/
Unknown Bottom**

Subclass	RB -- ROCK BOTTOM	UB -- UNCONSOLIDATED BOTTOM	AB -- AQUATIC BED	US -- UNCONSOLIDATED SHORE	ML -- MOSS-LICHEN	EM -- EMERGENT	SS -- SCRUB SHRUB	FO -- FORESTED	OW -- OPEN WATER/ Unknown Bottom
	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submerged 6 Unknown Surface	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	1 Moss 2 Lichen	1 Persistent 2 Nonpersistent	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Deciduous 6 Deciduous 7 Evergreen	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Deciduous 6 Deciduous 7 Evergreen	

L -- LACUSTRINE

1 -- LIMNETIC

2 -- LITTORAL

RB -- ROCK BOTTOM	UB -- UNCONSOLIDATED BOTTOM	AB -- AQUATIC BED	OW -- OPEN WATER/ Unknown Bottom	RB -- ROCK BOTTOM	UB -- UNCONSOLIDATED BOTTOM	AB -- AQUATIC BED	RS -- ROCKY SHORE	US -- UNCONSOLIDATED SHORE	EM -- EMERGENT	OW -- OPEN WATER/ Unknown Bottom
1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submerged 6 Unknown Surface		1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submerged 6 Unknown Surface	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	2 Nonpersistent	

MODIFIERS

In order to more adequately describe wetland and deepwater habitats one or more of the water regime, water chemistry, soil, or special modifiers may be applied at the class or lower level in the hierarchy. The listed modifiers may also be applied to the biological system.

WATER REGIME				WATER CHEMISTRY				SOIL	SPECIAL MODIFIERS
Non-Tidal		Tidal		Coastal Salinity		Inland Salinity		pH Modifiers for all Fresh Water	
A. Temporarily Flooded	H. Permanently Flooded	K. Artificially Flooded	*S. Temporary Tidal	1. Hypersaline	7. Mesosaline	8. Euxaline	a. Acid	8. Organic	b. Slaver
B. Saturated	J. Intermittently Flooded	L. Subtidal	*R. Seasonal Tidal	2. Euryhaline	8. Euhaline	9. Mesohaline	i. Alkaline	9. Mineral	b. Partially Drained/Drifted
C. Seasonally Flooded	K. Artificially Flooded	M. Irregularly Flooded	*I. Semi-permanent Tidal	3. Mesohaline (Brackish)	9. Mesohaline	10. Oligohaline		1. Formed	c. Diked/Impounded
D. Seasonally Flooded/ not Drained	W. Intermittently Flooded/Temporary	N. Regularly Flooded	*V. Permanent Tidal	4. Polyhaline	10. Oligohaline	11. Oligohaline			d. Artificial Substrate
E. Seasonally Flooded/ Saturated	Y. Saturated (Semi-permanent)/Saturated	P. Irregularly Flooded	U. Unknown	5. Hypersaline	11. Oligohaline	12. Oligohaline			e. Spill
F. Semi-permanently Flooded	Z. Intermittently Flooded/Permanent			6. Hypersaline	12. Oligohaline	13. Oligohaline			f. Excavated
G. Intermittently Flooded	U. Unknown			7. Hypersaline	13. Oligohaline	14. Oligohaline			

*These water regimes are only used in saline influenced freshwater systems

Special Status Species Habitat

Special status species include those that are federally listed (threatened or endangered), federally proposed to be listed, federal candidate, state listed (threatened or endangered), Bureau sensitive, and Bureau assessment species (see Glossary).

Special Status Wildlife Species

Several species of concern have either been documented in the area or potentially occur in the habitats found on the Wood River property. Table 3 lists special status wildlife species and their status.

Several federally listed species, such as the bald eagle, shortnose sucker, and the Lost River sucker use the area on a year-round basis. See the Special Status Fish Species section for a discussion of the suckers. Other special status species, such as the tricolored black bird, long-billed curlew, and the white pelican, use the area seasonally.

Recently, several spotted frogs (federal candidate species) were discovered on the Wood River property. Historically this frog occurred throughout the Basin, but a 1993 field search of historical sites yielded no frogs (Marc Hayes, pers. comm. 1993). This discovery on the Wood River property is one of only documented occurrences of the spotted frog in Klamath County in recent years.

Use of habitats is discussed in the Wildlife Habitat and Fish Habitat sections.

Special Status Plant Species

No populations of special status plant species are known to occur on the Wood River property. However, the Kirk-Chock soil association on the northern third of the property (poorly drained loams subject to frequent flooding unless they are protected by dikes) is similar to the Henley Lake loams that support the few known populations of Applegate's milkvetch (*Astragalus applegatei*), a species that is federally listed as endangered. Although the descriptions of

the two soil types contain some differences, the loams on the northern third of the property should be considered possible habitat for Applegate's milkvetch since little is known about the precise habitat requirements of this species. However, a 1994 inventory that covered the northern third of the property for Applegate's milkvetch did not locate any population of this species.

Special Status Fish Species

The Lost River and shortnose suckers (both federally endangered species) are endemic to waters of the Klamath Basin. These species are primarily lake dwelling species that migrate up tributaries to spawn. After spawning they return to the lake environment. The Lost River sucker has been documented in Wood River, Sevenmile, and Crooked Creeks (Stubbs & White 1993). Larval Lost River suckers were found in Crooked Creek and Wood River in 1991 (Logan and Markle 1993). This indicates that the Wood River is still important for spawning migration for the adult Lost River sucker.

Shortnose suckers and Klamath largescale suckers (a federal candidate species) may also occur in the Wood River, however, neither species has been documented (John Fortune, pers. comm. 1993). Both endangered suckers are found in Agency Lake, which adjoins the Wood River property.

Table 3. Special Status Wildlife Species Known or Suspected in the Wood River Area

Species	Status
Shortnose sucker	FE/SE
Lost River sucker	FE/SE
Peregrine falcon	FE/SE
Bald eagle	FT/ST
Klamath largescale sucker	FC
Long-billed curlew	FC
Redband trout	FC/SS
Western pond turtle	FC/SS
White-faced ibis	FC/SS
Spotted frog	FC/SS
Tri-colored blackbird	FC/SS
Black tern	FC/SS
Loggerhead shrike	FC/SS
Least bittern	FC/SS
Greater sandhill crane	AS/SS
Snowy egret	AS/SS
Bank swallow	AS/SS
Western bluebird	AS/SS
Great egret	AS/SS
Yellow rail	AS/SS
American white pelican	AS/SS
Horned grebe	AS/SS

FT = Federal Threatened

FE = Federal Endangered

FC = Federal Candidate (category 2)

AS = BLM Assessment

ST = State Threatened

SE = State Endangered

SS = State Sensitive

Fish and Wildlife Habitat

The Wood River property provides for a great abundance and variety of wildlife species. Four primary habitat associations are discussed in this section: Permanent wetlands with aquatic or emergent vegetation; pastures (or meadow) of short grass communities that are dissected by a series of canals; woody and riparian vegetation areas, mostly along the dikes and Wood River; and open water areas on the lake and near the shoreline. See the vegetation section for further descriptions of these habitat types.

Wildlife using the Wood River property generally obtain one or more of the following life cycle needs: Foraging (feeding); roosting (resting); breeding, nesting, brooding, or rearing; staging (gathering) during migrations; denning (sheltering); basking (sunning); or other. Different life cycle needs are often supplied in different habitat types (for example, foraging in the pastures/meadows and roosting in the riparian areas). Wildlife could also use one, or more, habitat types differently depending on the season (for example, the pastures/meadows could be used as nesting habitat in the spring and foraging habitat in the fall). Other wildlife species use the area on a seasonal basis only.

In general, throughout this document the term waterfowl includes ducks, geese, and pelicans. Wading birds include species like herons and egrets, while shorebirds would include species like the long-billed curlews, sandpipers, phalaropes, and ibis. Species like tricolored blackbirds, meadowlarks, wrens, warblers, orioles, and sparrows are included in the neotropical migratory bird category. The term raptor includes species like eagles, owls, hawks, osprey, and northern harriers. Small mammals would include ground squirrels, mice, and voles. The furbearers term refers to species such as otter, beaver, and muskrat. Species like the spotted frog, western pond turtle, and bull frogs would be included in the terms amphibians and reptiles. Appendix D provides a list of animal species suspected or documented in the Wood River property area.

Upland Grass/Meadow Habitat

Some species will forage in this habitat type year-round if weather conditions permit (such as snow cover and open water). Other species such as the northern harrier and bald eagle will use the area year-round but use increases when weather conditions allow prey availability. Species likely to nest in this habitat type include many species of waterfowl, shorebirds, and neotropical migratory birds. Several species, such as white-fronted geese and various shorebirds use this habitat type as a staging and stopover area during migration.

Some animals, such as small mammals, are likely to use this habitat type throughout their lives. Irrigation canals on the Wood River property, the only permanent water source, appear to be important for the spotted frog (a federal candidate species - see the Special Status Species section).

Aquatic and Emergent Vegetation/Wetland Area

Animals that forage year-round in this habitat type include many species of waterfowl, raptors (including bald eagles), and wading birds. Seasonal foragers include many species of neotropical migratory birds, and some raptors. Species that nest in this habitat type include many species of neotropical migratory birds, shorebirds, and some raptors, such as the northern harrier. Many birds use this habitat type during migrations; waterfowl, neotropical migratory birds, and a variety of shorebirds. Waterfowl also use this habitat type for brooding and loafing.

Wetland habitat is also important to the furbearers for foraging and denning. Amphibians and reptiles may use this habitat for most if not all their life cycles.

The kind of wildlife that use the area, and the type of use is influenced by the depth of the water, the percentage of vegetation to open water, and the height of vegetation. Deeper water will favor diving ducks, such as redheads, ruddy ducks, and mergansers. The deeper water also takes longer to freeze and is open for staging and resting areas for migrating waterfowl. Shallower water favors puddle ducks, such as mallards, pintails, and teal; and wading birds such as herons, egrets, and shorebirds. These birds forage in the shallow waters because of an abundance of insects and desired vegetation.

Vegetation type and density also influences the type of wildlife use. Dense cattails provide forage and den construction material for muskrats. The stiffer and taller emergent vegetation (such as cattails) also provide nesting structure for birds, such as yellow headed blackbird, tricolored blackbird, common yellowthroat, and marsh wren. Waterfowl, such as redheads, use these vegetation clumps as nest sites and brood rearing areas.

The open areas within the marsh are used as foraging areas by terns, diving ducks, and swallows. These open areas are subject to wind action which causes a mixing of water. This mixing creates a wide variety of insects and plants that may be available to wildlife. It also delays freezing so open areas may be available longer.

The combination of water depth and vegetation type can also be important. Shallow water with short sedge and grass communities is desired by Canada and white-fronted geese and the yellow rail. The spotted frog prefers water 18 to 24 inches in depth with dense submerged vegetation. This allows the

surface water to heat up to the preferred temperature, yet allows deep escape water nearby. Both the yellow rail and spotted frog are special status species and their preferred habitats could become critical.

Riparian Areas

For information regarding wetland and riparian area functions refer to Appendix C.

Riparian areas are used extensively by wildlife for nesting habitat. Species that nest in this habitat type include waterfowl, wading birds, neotropical migratory birds, and raptors. Rough-legged hawks and other raptors may use the riparian habitats during the winter for foraging and roosting.

Riparian areas are used extensively by furbearers for foraging and denning habitat. Reptiles and amphibians may be found denning, feeding, and basking here. Small mammals also use riparian habitat extensively for all their life cycle needs.

Riparian areas are probably the most widely used and important habitat for wildlife. Many species will rely on or use riparian areas for part of their life cycles. Over 80 percent of the species identified in the area rely on or will select riparian zones for part of their life cycle.

Riparian areas with vegetative structure (such as shrubs and trees) are extremely important to Neotropical migrants both during the migration and nesting season. The stands of tall poplar trees along the main dike road and on an island along the westside of the Petric park canal, have the highest neotropical bird diversity on the Wood River property.

Open Water Habitat

Open water habitat within the property boundary includes seasonally flooded pastures, portions of the Wood River, and the canal leading to Petric Park. Agency Lake and the Wood River marsh border the property on the south. Waterfowl and some raptors, such as bald eagles, use this habitat for foraging on a year-round basis. Seasonal foragers include osprey and a variety of shorebirds. Waterfowl also use this habitat for loafing and staging. During migrations some shorebird species will use the edges of open water areas.

Fish Habitat

Fish that use streams and marsh areas in or adjacent to the BLM-administered property include non salmonid fish, such as brown and rainbow trout; and no salmonid fish, such as fathead minnows, largemouth bass, sunfish, and suckers (Lost River, shortnose, and Klamath largescale). The suckers are special status species and are discussed under that section.

The Wood River, which is managed by the Oregon Department of Fish and Wildlife as a wild trout stream, contains resident, self-sustaining populations of brown trout. This is the river's main fishery during the summer. In the fall, migratory rainbow trout use the river; they reside in Agency and Upper Klamath lakes and migrate up the Wood River to spawn. The young trout may remain in the river for one to two years before moving out to Agency and Upper Klamath lakes, where they grow until they are ready to spawn. The stretch of Sevenmile Creek that is adjacent to the BLM-administered land has been channelized so the potential of the fish habitat in that stretch is uncertain, although it receives some use for rearing habitat by young rainbow and brown trout. Sevenmile Creek is also used by rainbow trout migrating out of the lake (Roger Smith, pers. comm. 1993).

Stream habitat conditions that are important to fish include structure (such as vegetation, large woody debris, and deep pools), temperature regulation, substrate (bottom conditions), and clean flowing water. A wide variety of habitat conditions currently exist in the Wood River, with structure and substrate as possible factors limiting habitat quality (Roger Smith, pers. comm. 1993).

Much of the Wood River lacks sufficient structure (large woody material and pools) that would provide good hiding cover for the fish. The bottom condition (substrate) is primarily fine material and does not provide good spawning areas for fish.

The streamside vegetation and marsh areas are important as hiding and thermal cover for fish. The vegetation along the edges provide escape and hiding cover for young fish and adults. The vegetation may also serve as a refugium (see Glossary) from wave action or strong currents. Higher densities of larval suckers seem to occur in pockets of open water surrounded by emergent vegetation (Logan and Markle 1993).

Shallow water areas are also important habitat. Larval and juvenile Lost River and shortnose suckers inhabit near shore waters, primarily under 20 inches in depth, throughout the summer months (Stubbs & White 1993).

Areas adjacent to a stream that exhibits the influence of flowing water are preferred by both trout and suckers. These areas maintain lower temperatures and higher dissolved oxygen and are therefore preferred over the more stagnant waters in the marsh interior. After hatching, larval suckers will emigrate from stream spawning areas toward Agency Lake. During the day, the larvae will move to shallow shoreline areas in the river (Stubbs & White 1993).

The warmer, more stagnant waters of the marsh are used by lacustrine species, such as bass, perch, sunfish, and minnows.

When water conditions in upper Agency Lake become stressful to fish (high pH levels or low dissolved oxygen levels), usually in late summer, the fish seek out fresh water sources, such as the mouths of rivers, to better survive the stress periods. The outflow at the mouth of the Wood River and

Table 4. Fish Species of the Wood River Area

Common Name	Scientific Name
Pacific lamprey	<i>Lampetra tridentata</i>
White sturgeon	<i>Acipenser transmontanus</i>
Brook trout	<i>Salvelinus fontinalis</i>
Brown trout	<i>Salmo trutta</i>
Rainbow trout	<i>Oncorhynchus mykiss</i>
Klamath largescale sucker	<i>Catostomus snyderi</i>
Shortnose sucker	<i>Chasmistes brevirostris</i>
Lost River sucker	<i>Deltistes luxatus</i>
Blue chub	<i>Gila coerulea</i>
Tui chub	<i>Gila bicolor</i>
Fathead minnow	<i>Pimephales promelas</i>
Speckled dace	<i>Rhinichthys osculus klamathensis</i>
Brown bullhead	<i>Ictalurus nebulosus</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Largemouth bass	<i>Micropterus salmoides</i>
Yellow perch	<i>Perca flavescens</i>
Slender sculpin	<i>Cottus tenuis</i>
Klamath sculpin	<i>Cottus princeps</i>
Marbled sculpin	<i>Cottus klamathensis</i>

Sevenmile Creek are important areas for fish during this time of year.

Table 4 is a list of fish species known or suspected to occur in the Wood River area (John Fortune, pers. comm. 1993).

Vegetation

Vegetation on most of the Wood River property, which has been managed for pasture forage (grasses and forbs) the past few decades, is the result of intensive management for livestock production (see Appendix E for a partial list of plant species found on the property). This is shown by the difference between existing and native vegetation.

Upland Grass Vegetation

The northern third of the Wood River property, with soils classified as Kirk-Chock association, is dominated by Kentucky bluegrass (*Poa pratensis*). The native vegetation on this soil association is described as a wet meadow plant community dominated by tufted hair-grass (*Deschampsia caespitosa*), with northern manna-grass (*Glyceria borealis*), reedgrass (*Phragmites communis*), and Nebraska sedge (*Carex nebrascensis*) in very wet spots (USDA SCS 1985). This portion of the property has been used mainly for irrigated pasture and wildlife habitat.

The southern two-thirds of the property, with soils classified as Lather Muck association, is currently dominated by quackgrass (*Agropyron repens*). These poorly-drained soils are derived from reclaimed lake bottom sediment, so the native vegetation probably consisted of wetland and emergent vegetation, such as bulrush (*Scirpus* spp.), cattail (*Typha* spp.), and wocus lily (*Nuphar polysepalum*). This portion of the Wood River property has been used mainly for irrigated pasture.

Aquatic and Emergent Vegetation

The southeast portion of the property is part of the Wood River Marsh, which has water depths up to three feet. The native vegetation, which is also the existing vegetation, includes aquatic and emergent vegetation, growing in ponded histosol soils. The

area is dominated by bulrush and cattails, with wocus lily in some of the deeper water areas. Plant species comprising the submerged/emerged vegetation in this area include curly leaf pondweed (*Potamogeton crispus*), coontail (*Ceratophyllum demersum*), sago pondweed (*Potamogeton pectinatus*), horsetail (*Equisetum* spp.), and other pondweeds (*Potamogeton* spp.).

Woody and Riparian Vegetation

Willows (*Salix* spp.) are scattered in the southeast portion of the property and along the Wood River riparian area, which forms the property's northeast boundary. A narrow strip (approximately one acre) of willows and cottonwoods (*Populus* spp.) occurs along the ditch bank of the main access road on the southern edge of the property. Willows and cottonwoods are also found on a narrow spit of land between the Wood River marsh and Petric Park canal. For information regarding wetland and riparian area functions refer to Appendix C.

Special Status Plants

See Special Status Species Habitat section.

Noxious Weeds

Bull thistle (*Cirsium vulgare*), Canada thistle (*Cirsium arvense*), bitter nightshade (*Solanum dulcamara*), quackgrass (*Agropyron repens*), foxtail grass (*Hordeum jubatum*), and western water hemlock (*Cicuta douglasii*) have been noted on the Wood River property. Bull thistle, Canada thistle, and quackgrass are on the Oregon Department of Agriculture's "B" noxious weed list; however, Canada thistle, which is not very abundant on the property, is the only one of those treated as a noxious weed by Klamath County. An extremely poisonous western water hemlock native species, is not on any of Oregon Department of Agriculture's noxious weed lists, but is a noxious weed in Klamath County to be controlled as local conditions warrant. Although all parts of bitter nightshade are toxic, neither its nor foxtail grass are on the Oregon Department of Agriculture's noxious weed list. They are described in the *Weeds of the West* (Whitson 1991).

Livestock Grazing

As part of the Wood River property purchase agreement between the American Lands Conservancy and the BLM, a temporary, nonrenewable grazing lease was issued. This lease authorized grazing through November 30, 1994. The lease was issued to help facilitate the purchase transaction, to allow time for baseline data on various resources to be collected, and to allow the BLM time to prepare a management plan.

During the last five years of private ownership the ranch was operated as a cow/calf (called a pair) operation with up to 1,300 pairs of cattle. The season of use was typically late April through November, although the on and off dates varied. In 1993 and 1994, the BLM and American Lands Conservancy grazing leases had a season-of-use of May 1st through November 30th, with up to 1,300 pairs (a maximum of 7,200 Animal Use Months) authorized. No grazing was authorized for 1995. Use in the future, will be based on this EIS and management plan.

Drainage ditches dissect the Wood River property into pastures of varying size and act, along with a few short fences, gates, and cattleguards, as reasonably effective barriers to livestock movement. The cattle are grazed rotationally through all of the pastures resulting in multiple periods of grazing followed by regrowth in each pasture. The pastures are variously flooded to enhance regrowth during the growing season.

The dominant forage grass in the south portion of the property is quackgrass, with the north portion dominated by Kentucky bluegrass (see the Vegetation section). In the Klamath Basin, soils that produce these types of dominant grasses, and are periodically flood irrigated, can be grazed intensively up to a maximum of 250 to 350 animal days or 8 to 12 animal unit months per acre (Randy Dovel, pers. comm. 1993). Besides being used as forage, some of the pasture areas, particularly in the east central portion of the property, were occasionally cut for hay.

Cultural Resources

Cultural resources (see Glossary) include prehistoric and historic resources, and Native American traditional use areas. Prehistoric resources are the remains of Native American occupation before contact with non-native people (approximately 1830

for the Klamath Basin). Historic resources are the remains of occupation of both native and non-native people after contact. Traditional use areas are geographic locations with cultural or religious importance to contemporary Native American groups.

Klamath people, notably the Kowa'cd'ikni (also spelled Kowa'cdi) are conjectured to have inhabited the area around the mouth of the Wood River into historic times. The Klamath Tribes' oral history indicates tribal use of the area. Therefore, traditional use locations are likely located within the property and artifactual remains are likely contained in and upon the earth surface within the property. The Wood River property is also known to contain peat bogs, and often, peat bogs adjacent to human occupation areas contain well preserved cultural remains.

Supporting evidence concerning the presence of the Klamath people in the Wood River property area, within the parameters of the archaeological and historical record, is provided by three basic references.

First, Dicken and Dicken (1985) cite Peter Skene Ogden in his 1826 journal as reporting the Kowa'cd'ikni to have adopted a marine strategy (living on artificial islands). The islands, built of stone and earth and contained within wood pilings, were only accessible by canoe. Ogden's journals establish the Kowa'cd'ikni in residence at the mouth of a river, three miles from his camp (perhaps at Modoc Point). This would then place the Kowa'cd'ikni either at the mouth of the Williamson or the Wood River depending on the location of that camp. Spier (1930) cites Ogden and quotes him extensively. However, Spier omits reference 44 on the Kowa'cdi, even though he shows their location on a map. From this, it appears that Ogden never visited the Wood River village, and that his references are of the Williamson River area and points south of there. Ogden does report contact with a small village of five huts. This could have been the Kowa'cd'ikni.

Ogden's contact with the Kowa'cd'ikni was on or about December 1, 1826, when winter food sources were very short for both the Klamath and Ogden. Ogden reports a scarcity of game animals that forced him to butcher some of his horses for food. Ogden also reports that the Kowa'cd'ikni told him they subsisted during winter months primarily on root crops, and in the summer principally on antelope and fish. This is consistent with winter subsistence practices throughout the Northwest, including into the ethnographic present (see Glossary). Ogden was

able to trade for fish which he calls "carp," but were probably one of three types of mullet, Lost River sucker (*Deltistes luxatus*), shortnose sucker *Chasmistes brevirostris*, or Klamath largescale sucker (*Catostomus snyderi*). All of these were found in Agency Lake and its tributaries at that point in time, but carp had not yet been introduced from China. The fish references are consistent with a marine or riverine (see Glossary) living strategy and supports the Kowa'cd'ikni at the mouth of a river. The reference to antelope is troublesome in that antelope favor wet meadow environments over wetland areas. This might make the Williamson River location the more likely site of the village than the Wood River location. Also, antelope tend to follow larger food animals such as elk, which also suggests the Williamson River area as the village site.

Second, Follansbee et al. in their 1978 Cultural Resource overview of the Jackson-Klamath Planning Unit discuss John C. Fremont's 1843 and 1846 expeditions. Fremont notes "smokes" in the marsh and villages along the rivers and lake front areas as he first traveled through the Klamath Marsh. On his return trip (around 1849), Fremont reported, in his journal, reaching Upper Klamath Lake near the spot where he turned east in 1843. He reports:

"This is a great fishing station for the Indians, and we met here the first (Klamaths) we had seen since leaving the lower valley. They have fixed habitations around the shores of the lake, particularly at the outlet and inlet up to the swamp meadow, where we met the Klamaths in the winter of '43-'44."

Third, archaeological investigations of the Klamath River Canyon by Dr. Joanne M. Mack (1991) indicates a heavy use of riverine resources by Klamath people, especially during the winter months. Other Great Basin people often exploited riverine resources during winter months as a part of their seasonal rounds. This then gives further credibility to the Kowa'cd'ikni at a river mouth location in December.

The Klamath Tribes' Cultural Resources Coordinator furnished the following observations (1993):

"It is known among tribal members that there were village sites and scattered clusters of houses all along Wood River. There are permanent houses of families that utilized the Wood River Valley, surrounding mountains, and

Agency Lake in their seasonal round. Thus it served the central area for many economic, spiritual, and social activities. Some such areas would be discernible through archaeological methods, others would not.

The specific area of the Wood River Ranch BLM property is the most important wocus gathering area on the east side of Agency Lake. It is also a hunting area for many species of waterfowl, a fishing area, a place where duck and geese eggs are gathered, and an area for collecting the roots and plant fibers of such plants as tules and cattails."

Based on the above information, there is a high probability that cultural resources are located within the Wood River property area, and that these resources need to be surveyed, identified, and protected.

The Wood River property, regarded by the Klamath Tribes as part of their cultural heritage, is located on land ceded by the Klamath Nation to the United States by the Treaty of Klamath Lake in 1864. Subsequent executive orders described the Klamath Indian Reservation and established the western boundary of the reservation as the center line of the Wood River. This boundary was located in the original survey, and reestablished by Hamacker's survey around 1890.

The Klamath Tribes view the area as an integral part of their cultural landscape and desire to participate in the cultural resource management of the area. The BLM tries to accommodate the Klamath Tribes' wishes when those wishes are within the laws and regulations that guide BLM management actions.

Recreation

The major recreation activities occurring in the Wood River property area are hunting, fishing, and general sight-seeing (driving for pleasure, viewing scenery, wildlife observation). When the property was privately owned, there was no public access, although several adjacent property owners had access through the area. When the south half of the property was acquired by the BLM (in 1993) it was opened to public access but closed to motorized vehicle use for several reasons: the roads are not of a high standard and are subject to severe rutting and potholes; the potential for damage to the sensitive

wetland habitat; the level of use and associated impacts is unknown; and to allow the BLM time to address other resource concerns.

When the property was in private ownership, hunting occurred, but no public hunting access existed. Now that the land is administered by the BLM, public hunting access to the Wood River property is available by foot or boat. Boat access is primarily from Petric Park, Henzel Park, private residents along Agency Lake's shores, and the upper portions of the Wood River. Petric Park, a Klamath County recreation site located approximately 1/2 mile north of the Wood River property's main gated entrance, offers boating/fishing access, picnicking, and sight-seeing opportunities.

The Wood River is a popular fishing stream. It is a nationally recognized trout fishery, and managed by the Oregon Department of Fish and Wildlife as a wild trout stream. Fishing from the Wood River's banks undoubtedly occurs. Several commercial fishing guides operate in the Williamson/Sprague/Wood River area. Public and private use figures and anglers origins (local vs non-local) are unknown.

Accurate recreation use figures are not available at this time. However, since acquiring the Wood River property, the BLM has been conducting some recreation use monitoring, including spot checks and informal surveys of visitors. Also, a visitor registration board was installed in December, 1994. Utilizing the information from the visitor spot checks, registration forms and an informal sample of known waterfowl hunters, some use trends and levels of use have been identified.

For waterfowl hunting, the average hunting party is estimated to be approximately 2.3 people. On the busiest weekends, such as during the opening of waterfowl hunting, approximately 20 to 30 vehicles were observed in the vicinity of the entrance to Wood River and at Petric Park. Assuming that vehicles associated with Petric Park were associated with fishing or hunting the Wood River property, then approximately 46 to 69 people would have been present at one time on the Wood River property. Only a maximum of 5 to 10 vehicles are typically observed in the area on other waterfowl hunting weekends.

The low numbers of visitors are the result of several factors. The restrictions on motorized access, limited vehicle parking and the 1/2 mile hiking distance that waterfowl hunters must go to access suitable hunting areas discourage many hunters. Also, the area may not be well known to many hunters or hunting

opportunities may have been poor. From a visitor experience standpoint, the low visitor use numbers provide an outstanding opportunity for a quality hunting experience for those visitors willing to walk the distance for hunting on the Wood River property. Visitors are currently able to use the area with a high probability of seeing very few other recreationists. The high quality recreation experiences available on the Wood River property are relatively rare on other similar public lands around the Klamath Basin.

From the recreation/visitor management standpoint, the low visitor use numbers provide the BLM with an opportunity to provide an area with high quality recreation experience opportunities. These visitors use numbers during hunting season would be expected to remain low as long as the motorized access is restricted. This constrained use level, allows the BLM to maintain a minimum presence because of few hunter conflicts. By needing only a minimal presence, the BLM benefits because the funding available for recreation management and on the ground visitors services is declining.

The waterfowl hunters that made the effort to hike the 1/2 mile into the Wood River property are rewarded with a high quality experience. And in an informal survey, the BLM found that a lot of the hunters preferred walking in from the Modoc Point highway, as part of the experience of the hunt. No one really expressed a desire for a parking area near the bridge. Some people did object to the idea of one being developed there, while a few were indifferent to where parking was situated. (Wood River Winter Development Report, Peter Scott, January 1995).

Visual Resources

Visual resources are the land, water, vegetation, structures and other natural features or cultural modifications that compose the scenery of BLM-administered lands. BLM-administered lands are inventoried, evaluated, and assigned an inventory class (I to IV) according to their worth from a visual resource management (VRM) perspective in order to consider visual, or scenic, resource values during management activities.

The Upper Klamath Lake viewshed covers the geographic area including Upper Klamath Lake, Agency Lake, and Wood River. This viewshed was inventoried as VRM inventory class II by the BLM in 1989. Although the Wood River property was not specifically identified during this VRM inventory, it is

included in this inventory class II viewshed. However, due to the highly modified condition of the property, it is currently estimated to be in a VRM inventory class IV condition.

The VRM inventory classes are used, along with other resource allocation decisions, in developing the long-term visual management objective classes for BLM-administered lands. The VRM objective classes for the Wood River property are described in Chapter 3 for each of the alternative proposals. The VRM objective class approved in the Record of Decision will provide the visual management standards for the design and development of future projects and rehabilitation of existing projects. The VRM classes are defined in the Glossary.

Wild and Scenic Rivers

In accordance with section 5(d) of the National Wild and Scenic Rivers Act and BLM Manual 8351, the sections of Sevenmile Creek and Wood River that are adjacent to or flow through BLM-administered lands were evaluated for their eligibility to be included in the National Wild and Scenic Rivers System. Neither river was found to be eligible (neither was found to be free-flowing); therefore, they were dropped from further consideration and were not included in either the management alternatives (Chapter 3) or environmental consequences (Chapter 4). See Appendix H for further discussion.

Mineral Resources

A private party and the BLM each own 50 percent of the mineral estate. The potential for exploration, development, and/or production of geothermal resources, natural gas, diatomite, or humates is low.

The Basin and Range physiographic province is characterized by a high rate of crustal extension accompanied by a higher-than-normal heat flow and late Tertiary-age to Quaternary-age volcanism. Rocks underlying the Wood River property are faulted and fractured permeable lava flows, breccias (see Glossary), and clastic sedimentary rocks, interbedded with impermeable altered tuffs and lacustrine (lake) sediments, that is, potential reservoir rocks; therefore, there is moderate potential for the occurrence of geothermal resources.

The upper Klamath Basin lies within the boundaries of Paleozoic- and Mesozoic-age sedimentary basins covered by thousands of feet of volcanic and volcanic-derived sedimentary rocks. It is possible that thick sequences of hydrocarbon-bearing sedimentary rock exist at depth. The U.S. Geological Survey has identified a prospect (see Glossary) for significant hydrocarbon accumulations in this area (Tennyson and Parrish 1987). There is some evidence to suggest that source rocks (see Glossary) suitable for natural gas generation could be present within the Hornbrook Formation, a sequence of Upper-Cretaceous-age marine sediments that may underlie the property. Whether volcanic activity and higher-than-normal heat flow in this area have enhanced or destroyed the hydrocarbon potential is not known. The potential for the occurrence of gas is moderate.

Diatomite, which is dried to a fine powder and used in the manufacture of dynamite and pottery glaze, occurs in the Klamath Basin in extensive deposits of varying thickness that are interbedded with other sediments in Pliocene- and Pleistocene-Holocene-age lake beds. Diatoms are growing today in Klamath Lake. The potential for the occurrence of accumulations of diatomite at depth is moderate.

On most of the Wood River property, there is high potential for the occurrence of peat and moderate potential for the occurrence of humates in the areas underlain by peat. Humates are used principally as soil amendments for growth stimulation. Humates, salts, or esters of humic acid are formed during the aerobic chemical and bacterial decomposition of plant material and also form as a result of the slow natural oxidation of lignite or subbituminous coal. The BLM considers peat to be a vegetative resource and humates to be a mineral resource.

Soil Resources

According to the Soil Survey of Klamath County (USDA SCS 1985), three soil types occur on the property - ponded histosols, Kirk-Chock association, and Lather Muck association (see Map 2). The following narrative describes where the soil types are found in the general area and some of the important characteristics of the soils; more specific information is available at the Klamath Falls Resource Area office or through the Soil Conservation Service. Certain vegetation types, described in the Vegetation section, are associated with these soil types.

Ponded Histosols

The ponded histosols are generally found in ponded, marshy sites that are underlain by stratified layers of peat, muck, and diatomaceous silt. They are found on the fringes of the Upper Klamath and Agency Lakes, including in the Wood River Marsh. The marsh, which is east of the Wood River and north of Agency Lake, is covered by up to three feet of water. Numerous submerged stream channels with water considerably deeper than three feet, areas where aquatic plants form a nearly continuous marsh cover, and large intermittent patches of open water also are mapped with this soil type.

Kirk-Chock Association

The northern third of the property (the upland area) has soils classified as Kirk-Chock association. These are poorly drained soils that occur on floodplains, and are formed in alluvial deposits on ash and cinders from volcanic dacite pumice flows. The surface is mostly uneven and hummocky, with slopes less than one percent. Permeability is rapid in the Kirk soil and moderate in the Chock soil. Runoff is very slow, and the hazard of erosion is slight except during periods of flooding, when channeling occurs. The soils are subject to frequent flooding in spring where not protected by dikes.

These soils are better suited to sprinkler irrigation of high value crops than to other irrigation methods; subirrigation probably increases the content of sodium and salt in the upper part of the soils. The surface layer of these soils is moderately alkaline in many places, which probably results from the current practice of subirrigating as well as surface irrigating.

Lather Muck Association

The southern two-thirds of the property contains soils of the Lather Muck association. These are very poorly drained soils on nearly level, reclaimed (diked and drained) bottomland north, west, and south of Agency Lake and in other diked and drained areas adjacent to Upper Klamath Lake. These soils formed in very deep deposits of partly decomposed fibrous organic material that has one or more thin layers of diatomaceous silt. This soil is frequently flooded for long periods of time; the water table, controlled by pumping from drains, is generally zero to three feet deep. Runoff is very slow, and the hazard of water erosion is slight. When the surface layer dries, the soil is subject to fires, as well as to blowing when disturbed by cultivation or traffic.

This moderately permeable soil is suited to sprinkler and border irrigation. Regardless of what method is used, maintaining uniform soil moisture above the water table to minimize unequal subsidence and reduce the hazard of fire is important. It is especially important to prevent the soil from drying completely in any part, because once it is dry, fibrous peaty material may be extremely difficult or impossible to rewet. The soil also can be subirrigated, but subirrigation can result in accumulation of excess sodium and salt in the upper part of the soil over a period of years. Alternative use of other irrigation methods at periodic, long term intervals is needed to maintain an acceptable salt balance in the soil where subirrigation is the usual method.

Prime and Unique Farmlands

None of these three soil types is considered Prime (see Glossary) according to the Soil Conservation Service classification. The local Soil Conservation Service office did not have a listing of Unique soils for Klamath County but said that these soils probably would not be considered Unique (see Glossary) because they are not considered Prime. See Map 2 for soil type locations.

Air Quality

The passage of the Clean Air Act in 1963 and subsequent amendments requires the state of Oregon to meet visibility and health standards through development of a State Implementation Plan (SIP). Oregon's SIP has been approved, as required, by the Environmental Protection Agency. The SIP identifies population centers in the state that do not need the National Ambient Air Quality Standards. Those elements identified in the SIP associated with resource management activities in the planning area are smoke from prescribed burning, fugitive dust from barren fields, and dust from roads or maintenance of roads/dikes.

Smoke is comprised of particulate matter (PM), which is one of the criteria air pollutants. Particulate matter with a nominal size of 10 microns or less (PM-10) is the specific pollutant of concern identified in the SIP. Klamath Falls is currently in violation of the PM-10 standard and is classified as a nonattainment area for this pollutant. Generally, nonattainment status is the result of winter periods of air stagnation and particulate pollution from wood stove use. Fugitive dust from recently tilled bare ground has on occasion contributed to higher levels of PM-10.

Burning is regulated by the Oregon Smoke Management Plan (OSMP), a part of the SIP (ORS 477.515 [3.a] and [3.b] and OAR 629-43-043). The Wood River property is located with an area in which a part of the OSMP designates as the Klamath Falls special protection zone. Burning is not allowed to affect the National Ambient Air Quality Standards of the special protection zone from November 1 to April 1. Therefore, burning is regulated within the county through burning permits and Klamath County Ordinances. Open burning is regulated to avoid periods of stable atmospheric conditions. Woodstove use has been successfully curtailed in the Klamath Falls urban area through the burn advisories (red, yellow, or green) to avoid violating National Ambient Air Quality Standards.

The Wood River property is located a short distance (8 to 12 miles) east to southeast of several Class 1 Air Quality areas (defined by the Clean Air Act as having basically "pristine" conditions). These include Crater Lake National Park, and Mountain Lakes and Sky Lakes Wilderness Areas. Located 25 to 30 miles east is Gearhart Wilderness. Burning, which would impact visibility, is prohibited by law from July 1 to September 15 of each year.

Prescribed fire on the Wood River property has historically only contributed minuscule amounts of smoke to the Klamath Basin airshed (see Glossary). Dust associated with tillage, dike repair, and road use is a larger contributor to particulate matter content in smoke and visibility impairment, but then only in a localized area.

Socioeconomic Conditions

The BLM-administered lands in Klamath County consist of approximately 21,000 acres of surface and subsurface estate and 21,000 acres of BLM subsurface estate only (private or state owned surface). (Final Klamath Falls Resource Area Management Plan and Environmental Impact Statement.)

Klamath County has an estimated 1992 population of approximately 59,400, with approximately 64.8 percent living in unincorporated areas. Approximately 14 percent of Klamath County's population is over 65 years of age which is the same as the statewide average.

Klamath County and southern Oregon in general has traditionally been economically dependent on natural resources. Timber, fisheries, agriculture, and recently tourism provide significant employment in the region.

Personal income information is an indicator of personal wealth in a particular area. This is because income statistics track both wage and non-wage sources. Non-wage sources include transfer payments, interest, dividends, and rent. Per capita personal income, 1992, Klamath County averaged \$14,421. Statewide, average per capita income, 1992, was significantly higher, averaging \$17,495. In recent years the trend has been a widening of this gap.

Detailed financial information regarding the revenues and expenses of the previous ranch operator is private and is not available for use by the BLM in this analysis. Public information regarding number of cattle raised, cattle weights at time of sale and sale prices, and season of use for a typical cow-calf operation was used as the BLM's estimate of current operations and future sales activities for this property under private ownership.

The private owners used the property as summer pasture for a cow-calf operation. (Most cows and bulls were kept over the winter, but the calves, culled cows and bulls were sold). At any one time in the summer, a total of 1,300 cow-calf pairs grazed the property. In the winter the cattle were shipped to California for winter pasturing or feeding. According to Rodney Todd (OSU extension agent) this is typical for most operations in the Fort Klamath/Agency Lake area. Because the details of the recent operation

and how the property would be used in the future if sold to another private owner are unknown, a published estimate of a ranch budget was used to represent the cattle production of a typical cow-calf operation in the south-central region of Oregon (Hewlett, et al. 1987). The number of cattle sold and their dollar values are displayed in Table 5.

The maximum number of cattle that the property can handle, without damage occurring to the land, with its present improvements is about 1,300 head; this is 3 times larger than the operation analyzed in the estimated ranch budget. For this reason total gross sales generated by the complete operation is expected to be approximately \$188,000. Because the cattle are run on the property only half the year only half of these gross sales, approximately \$94,250, can be attributed to the property. This level of gross sales supports 1.5 jobs and \$19,450 of personal income in the local economy.

According to the Oregon State University Extension Service, Klamath Branch, the gross cattle and calf sales in Klamath County during 1992, 1993, and 1994 were 38.9 million, 42.5 million, and 38.9 million dollars respectively.

Table 5. Cow-Calf Operation, South-Central Oregon¹

Product	Quantity	Weight(cwt) ²	Price ³	Value ³
Cull Bulls	3	13.0	58.75	2,291.25
Cull Cows	28	8.5	58.75	15,627.50
Open 1st Year	18	7.1	76.50	9,776.70
Heifers				
Heifer/Calves	99	4.0	76.50	30,294.00
Steer/Calves	151	4.5	76.50	51,981.75
Total Gross Sales				\$109,971.20

¹ Assumes 350 cows and 250 calves

² Per hundred pounds

³ Expressed in 1989 dollars

Chapter 3

Management Alternatives

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Summary of Major Changes

Alternatives B, C, and D have been modified to further clarify the management options available to the BLM in meeting the objectives of the alternatives. These changes have been made in partial response to public comment, in response to new information regarding management feasibility, and in response to on-going internal review. The overall concepts and objectives for each alternative have remained largely unchanged.

Introduction

This chapter explains the four alternatives that were fully considered to meet the purpose and need (described in Chapter 1) while addressing issues and concerns of the BLM, the public, and the Wood River Wetland Team (WRWT). Alternatives that were considered but dropped from further analysis are discussed first. Then the four management alternatives that were analyzed are described, starting with the alternatives objective and a summary paragraph, and followed by the management actions for each resource.

The four alternatives are: Alternative A, the No Action Alternative, which is a continuation of current management; Alternative B, which is a wetland restoration alternative that generally employs fairly simple methods that are considered low technology; Alternative C, which is a wetland restoration alternative that generally employs more structured and engineered technology; and Alternative D, the Preferred Alternative as chosen by the BLM with input from the WRWT, which is a combination of the other three alternatives. Management actions in these alternatives would be on BLM-administered lands and would not adversely affect adjacent landowners. Management alternatives (except Alternative A) were developed to meet the long-term goals and objectives, described in Chapter 1, for the Wood River property.

Agencies may protect resources against adverse impacts until a Record of Decision for management of an area is signed (40 CFR 1506.1[a]). Emergency protective measures were taken when the property was transferred from private to public ownership. Those measures, included closing the area to unauthorized motor vehicle use, to overnight use, and to fires of any kind, which were published in the Federal Register in July 1993 and clarified in January 1994, would be the difference between management of the property when under private ownership and current (BLM) management as analyzed in Alternative A.

Alternatives Considered but Dropped from Further Analysis

During the study process, various alternatives and management actions were considered but eliminated from detailed study. These alternatives failed to meet the purpose and need as described in Chapter 1, were not technically feasible, could not be implemented, were not considered legally permissible, or did not appear to have much, if any, public support.

An alternative that proposed to maintain irrigated pasture land for livestock grazing on the north half of the property, and to restore a wetland on the south half of the property was considered and dropped. This alternative does not meet the goals, as outlined in the purpose and need statement, of restoring wetlands and improving water quality on the property.

An alternative that proposed to increase the amount of grazing was considered and dismissed because it was outside the reasonable range of management actions/alternatives that would fit under the purpose of improving water quality and restoring wetlands on the property.

An alternative that consisted of only natural processes, such as eliminating dikes, prohibiting grazing, not regulating water with pumps, no road improvements, etc., was considered and dismissed. Potentially, much of the property would be submerged to such a depth that vegetation could not be reestablished on a large portion of the property. This alternative would likely not have much, if any, public support, nor would it meet the intent for management of the property.

Another alternative that proposed to incorporate low to moderate grazing use, a wide range of research projects, and moderate to intense developed recreation facilities was considered but eliminated from detailed study because it was felt that the range of actions covered in Alternatives A, B, and C adequately addressed the actions in this alternative.

Also considered but eliminated from further consideration was an "experiment station" alternative. Under this alternative, the primary objective would be to conduct research on various wetland conversion methods, and on the effects these methods would

have on water quality, quantity, and other variables. The entire parcel of land would be divided into cells or compartments for conducting various research projects. Upon completion of each project, its compartment would be modified to meet the needs of the next proposed project. This alternative was dropped from detailed study because it is inconsistent with the long-term goals described in Chapter 1.

The final alternative that was considered was one in which no change in management would occur from when the property was under private ownership. This alternative was eliminated from further consideration because it was so similar to Alternative A (the No Action, or Continuation of Existing Management Direction Alternative), and certain elements of it would not be implementable by the BLM due to the BLM's public land management responsibilities, as dictated in the Federal Land Policy and Management Act, and other laws, policies, and regulations.

Alternative A - No Action, Continuation of Existing Management Direction

Alternative A, referred to as the No Action Alternative, can be better described as a continuation of current management direction from the time of the BLM's purchase of the Wood River property and is a required alternative under the National Environmental Policy Act (NEPA) of 1976, as amended (40 CFR1502.14(d)). Some actions are different than those occurring when the property was in private ownership because of laws, policies, and manuals that the BLM must follow when managing public lands; however, as previously stated, the No Action Alternative is basically the same as what would have occurred under private ownership, except for some minor resource protection measures. This alternative should not be misinterpreted to be an alternative where the BLM does no active management, which would be illegal under the BLM's organic act, the Federal Land Policy and Management Act.

Objective

To maintain the current use of the property as predominantly for livestock grazing in an irrigated pasture.

Livestock grazing would remain the primary use. Water would be pumped off in the spring at current schedules (see Chapter 2, Water Resources). The amounts of upland, wet meadow, and marsh habitat would remain constant. Recreation resources would be managed for minimum use levels.

Water Resources

Water quality studies currently in progress would be completed. Water quality monitoring (see Appendix B) would be conducted in accordance with BLM and national and local guidelines and priorities. Cooperation with other agencies in the sharing of data would continue. The irrigation system would continue to be operated similarly to its present operation (described in Chapter 2, Affected Environment).

Wetlands

Livestock grazing would not occur in the Wood River Marsh or riparian areas, unless necessary for resource manipulation. The remainder of the property would remain as reclaimed wetlands and would be grazed by livestock. Periodic dredging of Wood River would continue. The riparian area adjacent to the Wood River would be monitored periodically to determine if the current condition is being maintained or improved. Exchange-of-use agreements with adjacent ranchers to encourage water quality enhancement on privately owned land would be considered.

Special Status Species Habitat

If any special status species (federally or state listed as threatened or endangered, federally proposed as threatened or endangered, category 1 and 2 federal candidate, and Bureau sensitive) are suspected in an area proposed for a management activity, field surveys would focus on those species. If populations of these species were found, then their habitats would be protected through modification or abandonment of management actions as appropriate to eliminate adverse impacts to federally listed or proposed species and not contribute to the need to list category 1 and 2 federal candidate, state listed, or Bureau sensitive species.

If a project could not be altered or abandoned to eliminate a potential effect on a federally listed or proposed threatened or endangered species, then consultation with the U.S. Fish and Wildlife Service would be initiated, as required under section 7 of the Endangered Species Act.

For state listed and state proposed species, the BLM would coordinate with the appropriate state agency to develop policies that would assist the state in achieving its management objectives for those species.

Fish and Wildlife. No specific management actions, beyond the required actions mentioned in the previous paragraphs, would occur.

Plants. Inventories would be conducted if appropriate habitat is identified. Coordinate and cooperate with the Oregon Department of Agriculture regarding management activities with potentially adverse effects on a state listed or proposed plant species.

Fish and Wildlife Habitat

Riparian zones would be protected from grazing. A grazing system could be established to provide a healthy pasture/meadow habitat, which would retain more residual growth for nesting and foraging wildlife.

Vegetation

Fire Management

An initial attack agreement for suppression of wildfires would be established with the Winema National Forest, U.S. Fish and Wildlife Service, and/or the Oregon Department of Forestry.

Noxious Weed Management

Federal agencies are directed to control noxious weeds on federal lands by the Carlson-Foley Act (Public Law [PL] 90-583) and the Federal Noxious Weed Act of 1974 (PL 93-629). Noxious weed management on the Wood River property would be part of an integrated noxious weed management program as described in the Integrated Weed Control Plan and Environmental Assessment for the Klamath Falls Resource Area (OR-014-93-09). An appropriate combination of manual, mechanical, chemical, and biological methods would be used to control noxious weed species. Any herbicide use would be in accordance with the program design features outlined in the Integrated Weed Control Plan.

All chemical and some mechanical treatments for noxious weeds would be accomplished through a contract with Klamath County, or other appropriate contractor, if populations of these species are identified for control. Appropriate herbicides would be used for treatment of noxious weeds in or adjacent to wetlands. Biological control organisms are supplied and/or distributed by the Oregon Department of Agriculture (ODA) through a memorandum of understanding between the ODA and the BLM's Oregon State Office.

Livestock Grazing

Under this alternative, livestock grazing would remain similar to that outlined in Chapter 2 (Affected Environment), as directed for other portions of the Klamath Falls Resource Area by the Klamath Falls Resource Management Plan (RMP), and as required by BLM regulation, policy, and guidance. Up to 650 head/pairs of cattle would be grazed on the property between approximately May 1 and November 30 each year, up to a maximum of 3,600 animal unit months (see Glossary). The level of use allowed under this alternative is about half the level use made in recent years. Observations of cattle use in 1993 and 1994 showed that utilization levels were about double what would be acceptable under current BLM guidance and planning.

Cattle use would be rotated between the various "ditch-defined" pastures as determined necessary and prudent by the grazing lessee and the BLM. All or most of the pastures on the property would be expected to be grazed at some time during the grazing season. Livestock use along the Wood River and Sevenmile Creek riparian area and in the Wood River Marsh would be prohibited unless necessary for resource manipulation purposes. Existing cattle-guards, fence, ditches, gates, and livestock handling facilities would be maintained or enhanced to sustain the current livestock operations.

An allotment management plan outlining specific grazing formulas and systems, specific locations of individual projects, schedules for management actions, monitoring methods and schedules, and other actions necessary for proper grazing management would be included in the Record of Decision for this environmental impact statement.

The Wood River allotment would be initially categorized as an "I", or improve, category allotment under this alternative. The purpose of this selective categorization is to prioritize allotments so as to direct management efforts and funding to the areas or allotments with the greatest need and/or opportunities. The "I" category allotments receive the most management attention, followed by "M", or maintain, allotments and, lastly, the "C", or custodial, category allotments. The 1994 Klamath Falls Resource Area Resource Management Plan/Environmental Impact Statement (RMP/EIS) provides further explanation of the allotment categorization (selective management) process. The plan also provides resource area

specific information and direction on management of the grazing program, including how future adjustments in grazing management will be implemented, as well as general allowable use and condition objectives, and the rangeland monitoring and evaluation processes. Direction from these plans would apply to the Wood River property.

Cultural Resources

A class 1 inventory would be conducted on the property. A class 1 inventory is a comprehensive literature search to determine the existence of cultural remains within the project area. A class 3 survey, which is an intensive survey of the ground to identify and record all cultural resource sites within a specific location, would be completed prior to commencing any surface-disturbing activities.

Consultation with the Klamath Tribes would occur during the monthly BLM/Klamath Tribes meetings on cultural resources, and at other times, if deemed necessary. This consultation would include updates on existing projects and discussion on new projects anticipated on the Wood River property. Consensus would be sought on all projects.

Recreation

The area would be closed to motorized vehicles and to overnight use. No campfires, fireworks, or smoking would be permitted. Hunting, fishing, sightseeing, and wildlife viewing would be allowed. Hunting and fishing use would be monitored and coordinated with the Oregon Department of Fish and Wildlife (ODFW) to develop and adjust hunting and fishing policies. Non-motorized recreation opportunities would be provided. Minimal recreation facilities (such as picnic tables, portable toilet, etc.) could be provided for protection of resource values, public safety, and health. See Map 4.

Visual Resources

The property would be managed to meet Visual Resource Management (VRM) Class IV objectives, which would be to allow management activities that entail major modification of the natural character of the landscape (BLM Manual Handbook H-8431-1). Under VRM Class IV management, the level of change to the landscape can be high and management activities may dominate the view and be the major focus of viewer attention.

Special Areas

According to BLM Manual 1613.2, areas recommended internally (within the BLM) or externally (members of the public or of other agencies) for consideration as an area of critical environmental concern (ACEC) must be evaluated by the BLM. The Wood River property was recommended for designation as an ACEC and therefore was evaluated for designation as an ACEC. (See Appendix 6 for the relevance and importance criteria and evaluation process). The Wood River property would not be designated an ACEC because under this alternative, the relevant and important values will not be preserved.

Mineral and Energy Resources



Although the potential for the occurrence of natural gas, geothermal resources, humates, and diatomite is moderate, the potential for mineral activity is considered to be low.

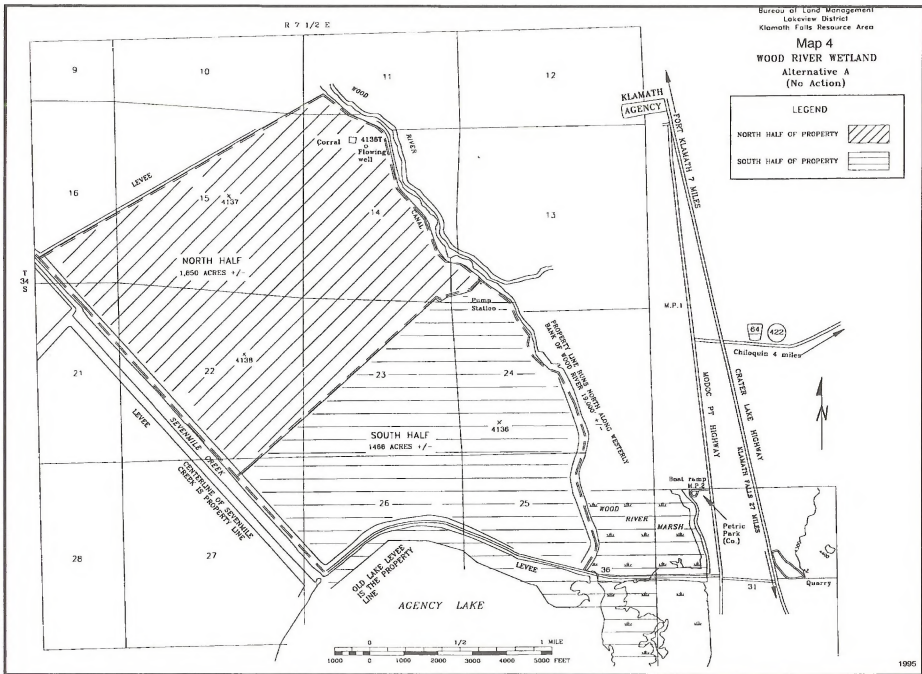
To ensure mineral and other activities do not conflict with other management goals, the lands would be withdrawn from (closed to) settlement, sale, location, and entry under the general land laws, including the United States Mining Laws (30 USC Ch. 2 [1988]), but not the mineral leasing laws, subject to valid existing rights. Energy and mineral leases would be subject to a "no surface occupancy" stipulation. The "no surface occupancy" stipulation could be waived if it was demonstrated that the mineral activity was consistent with other management goals. Mineral or energy activity also would be subject to other federal and state regulations, such as the Clean Water Act, Endangered Species Act, etc.

Bureau of Land Management
 Loosview District
 Klamath Falls Resource Area

Map 4
WOOD RIVER WETLAND
 Alternative A
 (No Action)

LEGEND

NORTH HALF OF PROPERTY	
SOUTH HALF OF PROPERTY	



Soil Resources

No specific management actions to mitigate soil degradation would be designated.

Air Resources

Monitoring of air quality would be conducted as required by regulation and peer practice to meet the goals of the Federal Clean Air Act, as amended; the Oregon Implementation Plan; and the Oregon Smoke Management Plan.

Roads and Facilities

Existing easements (see Glossary) with adjacent property owners would be recognized and the BLM would follow the terms and conditions of those easements. The Wood River property would remain closed to motorized vehicles, except for those people with administrative access or easements. Dike roads would be maintained but not improved. Periodic maintenance of major dikes, especially the southern dike adjacent to Agency Lake, would be conducted to preserve the integrity of the dike. The bridge over Wood River would be inspected and maintained according to BLM bridge maintenance schedules (BLM Manual 9112.4).

Existing facilities, including cattle guards, fences, gates, ditches, pumps, pump house, bunkhouse shack, corral, and livestock handling facilities (corral) would be maintained to sustain the livestock operation (see Map 4).

Alternative B

Objective

To restore the Wood River property to a functioning wetland with diverse plant communities and healthy, productive vegetation.

The majority of the Wood River property would be restored to a functioning wetland consistent with the long-term goals described in Chapter 1. Under this alternative, initial management actions could require highly engineered techniques, such as restoring the Wood River and Sevenmile Creek to their historic meandering channels; however, in the long term, wetland restoration systems and methods would be designed for minimum maintenance using the existing landscape features (such as topography) and natural energies (such as stream flows) of the property. Vegetation management (including water level fluctuations, fire, and mechanical manipulation) would be used to develop a diversity of plant communities and to maintain healthy and productive vegetation. Livestock grazing and chemical treatments (except for treatment of noxious weeds) will not be used to manage vegetation under this alternative. The amounts of upland habitat would decrease, while wetland habitat, such as wet meadows and marshes would increase. Recreation resources would be managed for moderate use levels.

Water Resources

Improvement in water quality entering Agency and Klamath lakes would be through changes in current management practices and passive filtration. The BLM would cooperate in studies to determine the effectiveness of the wetland system in improving water quality and storage (see Appendix F). The current irrigation system would be used to manipulate water levels and/or soil moisture conditions to maintain the wetland habitat. The majority of the property would be restored to approximately pre-development conditions to the extent that it wouldn't adversely impact adjacent landowners.

The exact techniques used for wetland restoration have not been finalized. Several likely restoration scenarios are summarized in Table 6 (see Appendix F for a more detailed description). Actual wetland restoration methods probably would not vary significantly from methods described in this document. The BLM would coordinate with the Oregon Department of Environmental Quality, US Fish and Wildlife

Table 6. Summary of Stream Channel and Wetland Restoration Options

Option	Description	Alternatives			
		A	B	C	D
STREAM CHANNEL RESTORATION OPTIONS					
1	<p>Restore the Wood River by establishing a meandering flow pattern in the Wood River Marsh (outside the dike from the main property's interior). This would include dredging channels within the existing marsh to be consistent with the historic meandering pattern shown on old aerial photos. Fill from dredging would be placed in the existing dredged channel. The existing levees would be maintained.</p>		X	X	
2	<p>Restore wetland by establishing a meandering flow pattern for Sevenmile Creek through the main property's interior. Because of flow levels in Sevenmile Creek, flow control structures would probably be installed at the northwest corner of the property, the northwest corner of the south half of the property, and in the central interior dike. Low flows would tend to be confined to channels, whereas high flows would likely flood the area. Fish passage and extent of habitat that is accessible to fish would be maximized.</p>		X		
3	<p>Restore wetland by establishing a meandering flow pattern for Wood River through the main property's interior. Because of flow levels in Wood River, flow control structures would probably be installed at the northeast corner of the property, the northeast corner of the south half of the property, and in the central interior dike. Low flows would tend to be confined to channels, whereas high flows would likely flood the area. Fish passage and extent of habitat that is accessible to fish would be maximized.</p>		X		
4	<p>Restore meandering flow patterns for the Wood River and Sevenmile Creek by relocating portions of the existing levees along these streams. Prior to relocating the existing levees, new channel meanders could be constructed along the west bank of the Wood River. New levees would be constructed 50 to 400 meters interior to the existing levees. Portions of the existing levees could be left in place as islands or used to construct point bars. Natural hydrologic processes would then be allowed to establish wider riparian areas, and to enhance channel sinuosity.</p>				X

Table 6. Summary of Stream Channel and Wetland Restoration Options (continued)

Option	Description	Alternatives			
		A	B	C	D
WETLAND RESTORATION OPTIONS					
1	Restore wetland by operating the existing a canal and pump system. The wetland would be restored and maintained by manipulating water levels within a system of berms and water control structures. Water levels would be manipulated to manage wetland vegetation within created cells (Alt. B - 2 cells, Alt. C - 8 to 20 cells, Alt. D - 4 to 8 cells). This system would be designed so that option 2 could be incorporated at some point in the future.		X	X	X
2	Restore wetland by re-establishing the lake-wetland interface (opening the property's interior to prevailing water levels in Agency Lake). This could be accomplished by installing pipes or culverts through the dike along the north shore of Agency Lake, allowing lake water passage between the lake and the south half of the property. Culverts or other water-control structures could also be installed in the east and west dikes, and in the interior containment dike separating the north and south halves of the property. This would allow for movement of fish, wildlife, and plant species between Agency Lake, Wood River, Sevenmile Creek, and the main property, as well as restoring wetland habitat to the majority of the Wood River parcel.		X	X	X
3	Restore wetland supported by inflows from Sevenmile Creek (no predefined path) and outflow to Agency Lake. The water would flow through the restored wetland (main property's interior) without a predefined path and would be subject to existing site topography. No channels would be created. Existing canals could either be filled with dirt or left open, depending on anticipated interaction with flows. Because of flow levels in Sevenmile Creek, flow control structures would probably be installed at the northwest corner of the property, the northwest corner of the south half of the property, and in the central interior dike.		X		

Table 6. Summary of Stream Channel and Wetland Restoration Options (continued)

Option	Description	Alternatives			
		A	B	C	D
WETLAND RESTORATION OPTIONS (CONTINUED)					
4	Restore wetland supported by inflows from Wood River (no predefined path) and outflow to Agency Lake. The water would flow through the restored wetland (main property's interior) without a predefined path and would be subject to existing site topography. No channels would be created. Existing canals could either be filled by dirt or left open, depending on anticipated interaction with flows. Because of flow levels in Wood River, flow control structures would probably be installed at the northeast corner of the property, the northeast corner of the south half of the property, and in the central interior dike.		X		
5	Construct and operate small pilot study areas, primarily to refine design details and operating procedures necessary to proceed with intensive wetland restoration and water quality improvement projects on the Wood River property or on other lands. The number and extent of these pilot studies could vary spatially and temporally. These pilot studies would address essential feasibility and design-relation questions relating to intensive or passive water quality treatment and wetland restoration. It is expected that, due to research and implementation schedules, a significant portion of the property could be included in pilot study areas for at least five to ten years.			X	
6	Establish a wetland system/water quality treatment system that is designed to provide the specific flow distribution, retention time, and contact characteristics (vegetation/water contact) that enhance water treatment performance. These characteristics are discussed in Appendix 6. The system design would include construction of internal berms and water controls to induce desired hydrodynamic attributes. The wetland treatment system would be operated during specified times to improve the quality of water entering Agency Lake or to intercept incoming nutrients at critical times (generally, during the summer months when water quality in the lake system declines). This intensive water quality treatment system could ultimately be converted in the long term to a restored wetland that is self sustaining.			X	

Service, and the Army Corps of Engineers (among others) to obtain any necessary permits prior to the construction of any stream channel or wetland restoration projects.

Stream Channel Restoration Options. Wood River and Sevenmile Creek would be restored to approximate their condition prior to dredging and channelization. This restoration would only occur within BLM-administered lands. Stream channel restoration methods could include one or more of the options shown in Table 6.

Wetland Restoration

The majority of the Wood River property would be restored to a wetland in properly functioning condition. Wetland restoration systems and methods would be designed for minimum maintenance using the existing landscape features (such as the topography), natural energies (such as stream flows), and vegetation manipulation (including water level fluctuations, mechanical manipulation, and prescribed burning). Limited plantings of riparian and wetland vegetation would occur, using native and naturally-occurring species. For example, native tree and brush species would be planted along dikes in clumps to stabilize them and provide bird habitat.

Methods to restore the main property's interior to wetland could include one or more of the options shown in Table 6.

These options could be used in various combinations on all, or portions of, the Wood River property.

Special Status Species Habitat

If any special status species (federally or state listed as threatened or endangered, federally proposed as threatened or endangered, category 1 and 2 federal candidate, and Bureau sensitive) are suspected in an area proposed for a management activity, field surveys would focus on those species. If populations of these species were found, then their habitats would be protected through modification or abandonment of management actions as appropriate to eliminate adverse impacts to federally listed or proposed species and not contribute to the need to list category 1 and 2 federal candidate, state listed, or Bureau sensitive species.

If a project could not be altered or abandoned to eliminate a potential effect on a federally listed or proposed threatened or endangered species, and

abandonment of the project was not considered feasible, then consultation with the U.S. Fish and Wildlife Service would be initiated under section 7 of the Endangered Species Act.

For state listed and state proposed species, the BLM would coordinate with the appropriate state agency to develop policies that would assist the state in achieving its management objectives for those species.

Fish and Wildlife. Specific management actions for special status species habitat under Alternative B can be found in the Water Resources and Fish and Wildlife Habitat sections.

Plants. Inventories would be conducted if appropriate habitat is identified. Coordinate and cooperate with the Oregon Department of Agriculture regarding management activities with potentially adverse effects on a state listed or proposed plant species.

Fish and Wildlife Habitat

Native tree species would be planted in clumps along major dikes for cover and future nest and perch sites, as well as to mitigate dike erosion. Portions of levees would be planted with native shrubs to provide nesting and roosting areas for neotropical migrant birds. Vegetation management (using natural water fluctuations, prescribed fires, mechanical manipulation, or other methods) could be used to create habitat diversity and edge effects within the wetland.

River meanders would be recreated to improve fisheries habitat. Riparian habitat along the Wood River and Sevenmile Creek would be restored and maintained. Large, woody structure (trees) would be placed in and along river and creek banks to provide cover for fish. Channel morphology and substrate would be studied as they relate to factors limiting fish production, and modified as necessary.

Vegetation

Fire Management

An initial attack agreement for suppression of wild-fires would be established with the Winema National Forest, U.S. Fish and Wildlife Service, and/or the Oregon Department of Forestry. Parameters would be developed under which fire could be introduced as an ecosystem process to achieve resource management objectives. Prescribed burning could be implemented through planned ignition. To

mitigate air quality problems, all burning would be conducted during unstable atmospheric conditions and with favorable transport winds.

Noxious Weed Management

Federal agencies are directed to control noxious weeds on federal lands by the Carlson-Foley Act (Public Law [PL] 90-583) and the Federal Noxious Weed Act of 1974 (PL 93-629). Noxious weed management on the Wood River property would be part of an integrated noxious weed management program as described in the Integrated Weed Control Plan and Environmental Assessment (EA) for the Klamath Falls Resource Area (OR-014-93-09). An appropriate combination of manual, mechanical, chemical, and biological methods would be used to control noxious weed species. Any herbicide use would be in accordance with the program design features outlined in the KFRA Integrated Weed Control Plan and EA.

All chemical and some mechanical treatments for noxious weeds would be accomplished through a contract with Klamath County, or other appropriate contractor, if populations of these species are identified for control. Appropriate herbicides would be used for treatment of noxious weeds in or adjacent to wetlands. Biological control organisms are supplied and/or distributed by the Oregon Department of Agriculture (ODA) through a memorandum of understanding between the ODA and the BLM's Oregon State Office.

Livestock Grazing

Under this alternative, livestock grazing would not be allowed on the Wood River property, for any reason.

Cultural Resources

A class 1 inventory would be conducted on the property. A class 1 inventory is a comprehensive literature search to determine the existence of cultural remains within the project area. A class 3 survey, which is an intensive survey of the ground to identify and record all cultural resource sites within a specific location, would be completed prior to commencing any surface-disturbing activities. An archaeologist (from the BLM and/or Klamath Tribes) would be on-site during these activities to monitor the site. Testing for artifacts could be done, based on surface or stream bank indicators.

Consultation with the Klamath Tribes would occur during the monthly BLM/Klamath Tribes meetings on cultural resources, and at other times, if deemed necessary. This consultation would include updates on existing projects and discussion on new projects anticipated on the Wood River property. Consensus would be sought on all projects.

Recreation

Roaded natural experience opportunities (opportunities to have a high degree of interaction with the natural environment) would be provided. Recreation resources would be managed for moderate use levels. Hunting, fishing, sightseeing, wildlife viewing, and other recreation uses would be supported by providing facilities and on-the-ground personnel. Such facilities include, but are not limited to, two improved (graveled or paved) parking areas (minimum 1/4 acre each, for a maximum of 1 acre total), improved roads to the parking areas, toilets, interpretive signing, nature trails (canoe, foot, mountain bike, horseback, and/or ski trails), a boat ramp to access Wood River Marsh, and an interpretive facility/observation tower. Facilities would be provided for user convenience, safety, and resource protection. The BLM would coordinate construction activities with the Oregon Department of Environmental Quality, US Fish and Wildlife Service, and the Army Corps of Engineers (among others) when designing, constructing, and obtaining the necessary permits for recreation facilities. Map 5 shows the locations of the improved roads, parking lots, and boat ramp.

The property would be closed to overnight use. No campfires, fireworks, or smoking would be permitted. Off-highway vehicles would be limited to improved roads, which under this alternative would be the east dike road along Wood River approximately up to the mid-way point of the property near the pump station, and the south dike road to the intersection with the east (Sevenmile Creek) dike road. Other roads would be closed to motorized vehicles, except those with administrative access or easements.

Because of the increased recreation management and investment, the area would be identified as a special recreation management area, as required in BLM Manual 1623.

Hunting and fishing use would be monitored and coordinated with the Oregon Department of Fish and Wildlife (ODFW) to develop and adjust hunting and fishing policies. Shooting would be prohibited in designated safety zones, which would be established for user safety and wildlife viewing. Jet boats and air

boats would be prohibited in wetland areas. Limits on speed and wakes would be coordinated with the Oregon State Marine Board and could be recommended to mitigate environmental degradation. The area would be identified as a Watchable Wildlife site in cooperation with the ODFW.

Visual Resources

The property would be managed to meet Visual Resource Management (VRM) Class II objectives, which is to retain the natural character of the landscape, which is a wetland. Changes in any of the basic elements (form, line, color, texture) caused by a management activity should be low. Contrasts are seen, but must not attract attention of the casual observer. Changes must repeat the basic elements found in the predominant natural features of the characteristic landscape. Projects or management actions would be evaluated using the BLM's contrast rating system to measure the degree of contrast between the proposed activity and the natural features of the landscape, and would meet or exceed VRM Class II objectives (BLM Manual Handbook H-8431-1).

Special Areas

The Wood River property was evaluated for designation as an area of critical environmental concern (ACEC) and was found to meet the relevance and importance criteria as described in Appendix G. Under this alternative the Wood River property would be designated an ACEC. The approved Upper Klamath Basin Resource Management Plan/Record of Decision would serve as the activity-level plan for the area.

Mineral and Energy Resources

Although the potential for the occurrence of natural gas, geothermal resources, humates, and diatomite is moderate, the potential for mineral activity is considered to be low.

To ensure mineral and other activities do not conflict with other management goals, the lands would be withdrawn from (closed to) settlement, sale, location, and entry under the general land laws, including the United States Mining Laws (30 USC Ch. 2 [1988]), but not the mineral leasing laws, subject to valid existing rights. Energy and mineral leases would be subject to a "no surface occupancy" stipulation. The "no surface occupancy" stipulation could be waived if

it was demonstrated that the mineral activity was consistent with other management goals. Mineral or energy activity also would be subject to other federal and state regulations, such as the Clean Water Act, Endangered Species Act, etc.

Soil Resources

Management activities would be designed and monitored to ensure that undue degradation of soils would not occur. Studies to determine the potential of peat and peaty soils as pollutant and nutrient filters would be encouraged.

Air Resources

Monitoring of air quality would be conducted as required by regulation and peer practice to meet the goals of the Federal Clean Air Act, as amended; the Oregon Implementation Plan; and the Oregon Smoke Management Plan. Earthwork would be conducted so that dust production would be minimized.

Roads and Facilities

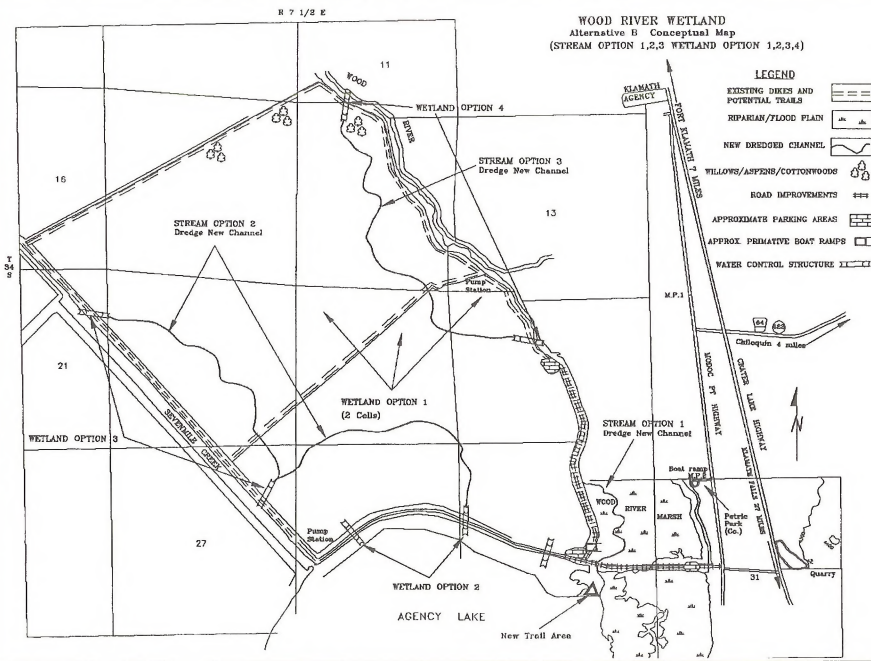
Existing easements with adjacent property owners would be recognized and the BLM would follow the terms and conditions of those easements. Roads could be improved (graveled or paved), consistent with overall objectives of this alternative. Motorized vehicle use would be limited to improved roads, which under this alternative would be the south dike road along Agency Lake, and approximately one mile of the east dike road along Wood River (see Map 5). Other roads would be closed to motorized vehicles, except those with administrative access or easements. Periodic maintenance of major dikes, especially the southern dike adjacent to Agency Lake, would be conducted to preserve the integrity of the dike. The bridge over Wood River would be inspected and maintained according to BLM bridge maintenance schedules (BLM Manual 9112.4).

If necessary to be consistent with overall management objectives of Alternative B, existing facilities, including cattle guards, fences, gates, ditches, bunkhouse shack, corral, and livestock handling facilities could be removed and disposed of in accordance with BLM property procedures (BLM Manual 1527.2 and 1533.2). The pumps and pump house would be maintained, and improved if necessary.

WOOD RIVER WETLAND
Alternative B Conceptual Map
(STREAM OPTION 1,2,3 WETLAND OPTION 1,2,3,4)

LEGEND

EXISTING DIKES AND POTENTIAL TRAILS	
RIPARIAN/FLOOD PLAIN	
NEW DREDGED CHANNEL	
WILLOWS/ASPENS/COTTONWOOD	
ROAD IMPROVEMENTS	
APPROXIMATE PARKING AREAS	
APPROX PRIMITIVE BOAT RAMPS	
WATER CONTROL STRUCTURE	



Alternative C

Objective

To restore the Wood River property to a functioning wetland with diverse plant communities and healthy, productive vegetation.

The majority of the Wood River property would be restored to a functioning wetland consistent with the long-term goals described in Chapter 1. Under this alternative, both initial and long-term wetland restoration could involve highly engineered techniques, complex designs, experimental methods, and/or pilot projects. The intent of these systems would be to improve water quality entering Agency Lake. When a system was developed with acceptable performance, the entire parcel could be converted to that system design. Research would figure more prominently in this alternative, and would encompass both the methods used for wetland restoration and the effects that restoration had on water quality and quantity, fish and wildlife habitat, and other relevant parameters. Vegetation management (including water level and flow fluctuations, livestock grazing, fire, chemical and mechanical manipulation) would be used to develop desired plant communities. Shallow water wetland habitat would be emphasized. Recreation resources would be managed for high use levels, and would emphasize education and interpretation.

Water Resources

Wetland restoration resulting in maximum water quality treatment would be emphasized (see Appendix F). After initial experimentation, the most effective pilot projects (as determined by the Wood River Wetland Team) could be chosen for long-term implementation on most or all of the Wood River parcel. The majority of the property would be restored to approximately pre-development conditions to the extent that it would not adversely impact adjacent landowners.

The exact techniques used for wetland restoration have not been finalized. However, several likely restoration scenarios are summarized here (see Appendix F for a more detailed description). Actual wetland restoration methods probably would not vary significantly from methods described in this document. The BLM would coordinate with the Oregon Department of Environmental Quality, US Fish and Wildlife Service, and the Army Corps of Engineers

(among others) to obtain any necessary permits prior to the construction of any stream channel or wetland restoration projects.

Stream Channel Restoration Options. The proposed method for stream channel restoration is shown in Table 6.

Wetland Restoration

The majority of the Wood River property would be restored to a wetland in properly functioning condition. Wetland restoration systems would be designed and constructed using established and newly developed methods and could involve highly engineered techniques, complex designs, experimental methods, and/or pilot projects. Vegetation manipulation could include water level fluctuations, mechanical and chemical manipulation, livestock grazing, and prescribed burning. Plantings and seedlings of various riparian and wetland plants (using native and naturally-occurring species) would occur as needed to support research and water quality improvement and, if compatible, to allow for aquaculture. Studies and restoration projects applicable to private land management could be pursued to promote water quality improvement programs on private lands.

Methods to restore the main property's interior to wetland could include one or more of the options shown in Table 6. These options could be used for the north half, the south half, or the entire Wood River property.

Special Status Species Habitat

If any special status species (federally or state listed as threatened or endangered, federally proposed as threatened or endangered, category 1 and 2 federal candidate, and Bureau sensitive) are suspected in an area proposed for a management activity, field surveys would focus on those species. If populations of these species were found, then their habitats would be protected through modification or abandonment of management actions as appropriate to eliminate adverse impacts to federally listed or proposed species and to not contribute to the need to list category 1 and 2 federal candidate, state listed, or Bureau sensitive species.

If a project could not be altered or abandoned to eliminate a potential effect on a federally listed or proposed threatened or endangered species, then consultation with the U.S. Fish and Wildlife Service would be initiated under section 7 of the Endangered Species Act.

For state listed and state proposed species, the BLM would coordinate with the appropriate state agency to develop policies that would assist the state in achieving its management objectives for those species.

Fish and Wildlife. Habitat for special status species could be improved/created. For example, mid-sized sedge habitat would benefit yellow rails; creation of pool habitat (18 to 24 inches in depth) may enhance spotted frog habitat. Pole perches would be installed in newly created wetland areas for bald eagle and other raptor hunting perches.

Management actions proposed for fish habitat improvement (see Fish and Wildlife Habitat) would also benefit endangered suckers. Additional management actions for special status species habitat can be found in the Water Resources and Fish and Wildlife Habitat sections.

Plants. Inventories would be conducted if appropriate habitat is identified. Coordinate and cooperate with the Oregon Department of Agriculture regarding management activities with potentially adverse effects on a state listed or proposed plant species.

Fish and Wildlife Habitat

Native tree species would be planted in clumps along major dikes for cover and future nest and perch sites, as well as to mitigate erosion of the dikes. Wildlife habitat could be improved or created, for example managing for tall grasses/sedges in uplands for early migrants such as geese and shorebirds; creating shrub fence rows along portions of levees for neotropical migrant bird nesting and roosting habitat; and placing nest structures for waterfowl, bluebird, and sandhill cranes. Vegetative management (such as fires, natural water fluctuations, and livestock grazing) could be used to create diversity and edge effects within the marsh.

Wood River's historic meanders could be restored in the Wood River Marsh to provide more fish habitat (see Water Resources section for more details). Riparian habitat along the Wood River and Sevenmile Creek would be restored and maintained. Large, woody structures (trees), and/or artificial structures (such as debris piles) would be placed along river and creek banks to provide cover for fish. Channel morphology and substrate would be studied as they relate to factors limiting fish production, and modified as necessary.

Vegetation

Fire Management

An initial attack agreement for suppression of wildfires would be established with the Winema National Forest, U.S. Fish and Wildlife Service, and/or the Oregon Department of Forestry. Parameters would be developed under which fire could be introduced as a tool to achieve objectives of particular projects.

Prescribed burning could be implemented through planned ignition on projects where the design includes fire. To mitigate air quality problems, all burning would be conducted during unstable atmospheric conditions and with favorable transport winds.

Noxious Weed Management

Federal agencies are directed to control noxious weeds on federal lands by the Carlson-Foley Act (Public Law [PL] 90-583) and the Federal Noxious Weed Act of 1974 (PL 93-629). Noxious weed management on the Wood River property would be part of an integrated noxious weed management program as described in the Integrated Weed Control Plan and Environmental Assessment (EA) for the Klamath Falls Resource Area (OR-014-93-09). An appropriate combination of manual, mechanical, chemical, and biological methods would be used to control noxious weed species. Any herbicide use would be in accordance with the program design features outlined in the KFRA Integrated Weed Control Plan and EA.

All chemical and some mechanical treatments for noxious weeds would be accomplished through a contract with Klamath County, or other appropriate contractor, if population of these species are identified for control. Appropriate herbicides would be used for treatment of noxious weeds in or adjacent to wetlands. Biological control organisms are supplied and/or distributed by the Oregon Department of Agriculture (ODA) through a memorandum of understanding between the ODA and the BLM's Oregon State Office.

Livestock Grazing

Under this alternative, livestock grazing would be used mainly as a vegetation management tool, to support the primary goal of wetland restoration. Livestock grazing could be allowed if needed to create or maintain wildlife habitat. No long term grazing lease will be issued. Levels and duration of

grazing, as well as maintenance and construction of range improvements, would be dependent on the need to meet management objectives. It is expected that the amount of grazing would be significantly less than that allowed under Alternative A, and it is possible that no grazing would occur. It is estimated that grazing use would not exceed 750 animal unit months in any given year. Any livestock use could be authorized and allowed via a competitive bid contract for the purposes of vegetative management and evaluated on a year by year basis. In lieu of or in addition to livestock grazing, haying of portions of the property would be considered as an alternative if vegetative removal was necessary to meet the wetland restoration goals. The allotment would be initially categorized as an "M", or maintain, category allotment under this alternative. The same planning (RMP/EIS) constraints and direction listed under Alternative A would also apply to this alternative.

Cultural Resources

A class 1 inventory would be conducted on the property. A class 1 inventory is a comprehensive literature search to determine the existence of cultural remains within the project area. A class 3 survey, which is an intensive survey of the ground to identify and record all cultural resource sites within a specific location, would be completed prior to commencing any surface-disturbing activities. An archaeologist (from the BLM and/or Klamath Tribes) would be on-site during these activities to monitor the site. Testing for artifacts could be done, based on surface or stream bank indicators.

Consultation with the Klamath Tribes would occur during the monthly BLM/Klamath Tribes meetings on cultural resources, and at other times, if deemed necessary. This consultation would include updates on existing projects and discussion on new projects anticipated on the Wood River property. Consensus would be sought on all projects.

Recreation

Rural recreation experience opportunities (opportunities to experience affiliation with individuals and groups are prevalent as is the convenience of sites and opportunities) would be provided. Recreation resources would be managed for high use levels, with emphasis on education and interpretation of wetland restoration processes. Hunting, fishing, sightseeing, wildlife viewing, and other recreation uses would be supported by providing facilities and on-the-ground personnel. Facilities would be designed for wetland restoration educational purposes

for moderate to high use by individuals and groups. The greatest investment in recreation facilities would occur under this alternative, and could include up to four graveled or paved parking areas (see Map 6); graveled or paved roads along Agency Lake, Wood River, and Sevenmile Creek; toilets at one or more parking areas; interpretive signing and trail networks (canoe, foot, mountain bike, horseback and/or ski trails) where deemed appropriate; up to four boat ramps to access Wood River, the Wood River Marsh, Agency Lake, and Sevenmile Creek; and an interpretive facility/observation tower. The BLM would coordinate with the Oregon Department of Environmental Quality, US Fish and Wildlife Service, and the Army Corps of Engineers (among others) to obtain any necessary permits prior to constructing recreation facilities.

The property would be closed to overnight use. No campfires, fireworks, or smoking would be permitted. Off-highway vehicles would be limited to improved roads, which under this alternative would be the south, east, and west dike roads. The north dike road would be closed to motorized vehicles, except those with administrative access or easements.

Because of the increased recreation management and investment, the area would be identified as a special recreation management area, as required in BLM Manual 1623.

Hunting and fishing use would be monitored and coordinated with the Oregon Department of Fish and Wildlife (ODFW) to develop and adjust hunting and fishing policies. Hunting and fishing could be limited more under this alternative than under the other alternatives, depending on locations and types of wetland restoration projects. Shooting would be prohibited in designated safety zones, which would be established for user safety and wildlife viewing. In the future, boat access could be provided to the main property. Air boats and jet boats would be prohibited in the wetland areas. No other limits on motorized boats would be imposed. The area would be identified as a Watchable Wildlife site in cooperation with the ODFW.

Designate the area as the Wood River Special Recreation Management Area (SRMA).

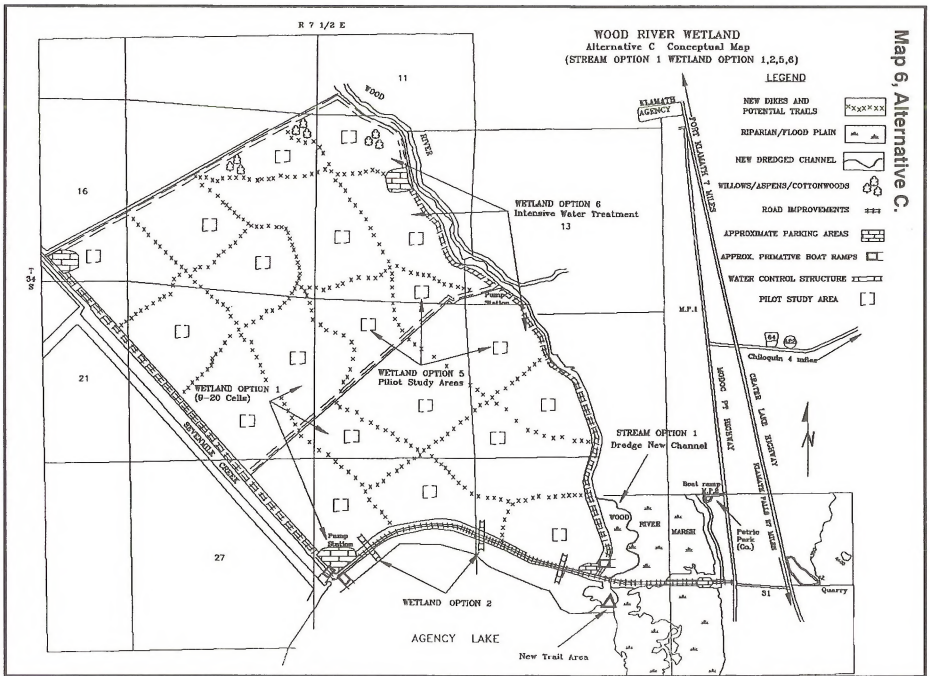
Visual Resources

The property would be managed to meet Visual Resource Management (VRM) Class III objectives, which is to partially retain the natural character of the landscape, which is a wetland. Changes in any of the basic elements (form, line, color, texture) caused

WOOD RIVER WETLAND
 Alternative C Conceptual Map
 (STREAM OPTION 1 WETLAND OPTION 1,2,5,6)

LEGEND

- NEW DIKES AND POTENTIAL TRAILS
- RIPARIAN/FLOOD PLAIN
- NEW DREGDED CHANNEL
- WILLOWS/ASPENS/COTTONWOODS
- ROAD IMPROVEMENTS
- APPROXIMATE PARKING AREAS
- APPROX. PRIMATEVE BOAT RAMPS
- WATER CONTROL STRUCTURE
- PILOT STUDY AREA



R 7 1/2 E

T 34 S

by a management activity can be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape. Projects or management actions would be evaluated using the BLM's contrast rating system to measure the degree of contrast between the proposed activity and the natural features of the landscape, and would meet or exceed VRM Class III objectives (BLM Manual Handbook H-8431-1).

Special Areas

The Wood River property was evaluated for designation as an area of critical environmental concern (ACEC) and was found to meet the relevance and importance criteria as described in Appendix G. Under this alternative, the Wood River property would be designated an ACEC. The approved Upper Klamath Basin Resource Management Plan/Record of Decision would serve as the activity-level plan for the area.

Mineral and Energy Resources

Although the potential for the occurrence of natural gas, geothermal resources, humates, and diatomite is moderate, the potential for mineral activity is considered to be low.

To ensure mineral and other activities do not conflict with other management goals, the lands would be withdrawn from (closed to) settlement, sale, location, and entry under the general land laws, including the United States Mining Laws (30 USC Ch. 2 [1988]), but not the mineral leasing laws, subject to valid existing rights. Energy and mineral leases would be subject to a "no surface occupancy" stipulation. The "no surface occupancy" stipulation could be waived if it was demonstrated that the mineral activity was consistent with other management goals. Mineral or energy activity also would be subject to other federal and state regulations, such as the Clean Water Act, Endangered Species Act, etc.

Soil Resources

Management activities would be designed and monitored to ensure that undue degradation of soils would not occur. Studies to determine the engineering properties of the soils on site could occur as needed to support construction work associated with the implementation of this alternative.

Air Resources

Monitoring of air quality would be conducted as required by regulation and peer practice to meet the goals of the Federal Clean Air Act, as amended; the Oregon Implementation Plan; and the Oregon Smoke Management Plan. Earthwork would be conducted so that dust production would be minimized.

Roads and Facilities

Existing easements with adjacent property owners would be recognized and the BLM would follow the terms and conditions of those easements. Roads could be improved (graveled or paved) to facilitate access to the entire parcel for wetland restoration projects and recreation uses. Motorized vehicle use would be limited to improved roads, which under this alternative would be the south (Agency Lake), east (Wood River), and west (Sevenmile Creek) dike roads (see Map 6). The dike road on the northern property boundary would be closed to motorized vehicles, except those with administrative access or easements. Periodic maintenance of major dikes, especially the southern dike adjacent to Agency Lake, would be conducted to preserve the integrity of the dike. The bridge over Wood River would be inspected and maintained according to BLM bridge maintenance schedules (BLM Manual 9112.4).

If necessary to be consistent with overall management objectives of Alternative C, existing facilities, including cattle guards, fences, gates, ditches, bunkhouse shack, corral, and livestock handling facilities could be removed and disposed of in accordance with BLM property procedures (BLM Manual 1527.2 and 1533.2). The pumps and pump house would be maintained, and improved if necessary (see Map 6).

Alternative D - The Proposed Action

Objective

To restore the Wood River property to its previous function as a wetland community, within unalterable constraints (such as water rights, land ownership patterns, and funds). Long-term improvements in water quality entering Agency Lake would be a goal; however, localized decreases in water quality could occur in the short term. Improving and increasing wetland and riparian habitats for federally listed fish and other wildlife would be emphasized. Labor-intensive, highly engineered wetland restoration methods using complex designs would be allowed; however, the preference would be to use wetland restoration systems and methods that were designed with less labor-intensive practices using the existing landscape features (such as topography) and natural energies (such as stream flows) of the property. Vegetation management (including water level and flow fluctuations, livestock grazing, fire, chemical and mechanical manipulation) would be used to develop desired plant communities. Pilot studies would be allowed. Adaptive management, the process of changing land management as a result of monitoring or research, would be used. Recreation resources would be managed for low to moderate use levels.

Water Resources

Objective: To improve the quality and quantity of water entering Agency Lake.

The majority of the property would be restored to a wetland community dominated by native species to the extent that it would not adversely impact adjacent landowners. Improvement in water quality entering Agency and Klamath Lakes would occur through changes in current management practices and passive filtration. The current irrigation system could be used or modified to manipulate water levels and/ or soil moisture conditions to maintain a wetland in properly functioning condition. The BLM would cooperate in studies to determine the effectiveness of the wetland system(s) in improving water quality and storage. The BLM would comply with all applicable Oregon State water laws and cooperate with the Meadows Drainage District in its operation and use of the Wood River property's irrigation system.

The techniques used for wetland restoration would be a combination of existing and constructed water control structures (berms, ditches, screwgates, and flashboard dams), and the encouragement of natural processes (plant succession, channel meandering). Several likely restoration scenarios are summarized in Table 6 (see Appendix F for a more detailed description). Actual wetland restoration methods would not vary significantly from methods described in this document. A site specific engineering design would be completed prior to construction. The BLM would coordinate with the Oregon Department of Environmental Quality, US Fish and Wildlife Service, and the Army Corps of Engineers (among others) to obtain any permits necessary prior to constructing stream channel or wetland restoration projects.

Stream Channel Restoration Options

Objective: To provide a wider riparian area and floodplain along Wood River and Sevenmile Creek that would allow for meandering flow patterns to develop. Encourage vegetation diversity, channel sinuosity, and complexity. This restoration would only occur within BLM-administered lands, would be consistent with Oregon State water laws, and would be designed to not adversely affect water use or rights of other landowners.

Stream channel restoration would be accomplished initially through Option 4 discussed in Table 6. New levees would be constructed 50 to 400 meters toward the interior of the property from the current locations. New channel meanders could be constructed between the new levee and the old levee along the west side of the Wood River. Restoration of meandering flow patterns would then be accomplished by removing portions of the existing levees along the streams. Other portions of the existing levees could be left in place or used to encourage meanders in the existing dredged channels. A wider riparian area and floodplain would be created along these streams. Natural processes would then be relied on to establish overflow channels, backwater areas, and to increase the sinuosity and complexity of the Wood River and Sevenmile Creek. This approach will allow the streams to establish their own courses across the floodplains over time. The long-term goal would be narrow, deeper, and more sinuous channels with wider riparian areas.

Because the Wood River channel has been less altered, and has the greatest potential to respond to restoration activities in the shortest period of time, restoration of the Wood River channel would be a

higher priority than Sevenmile Creek. Therefore, restoration activities would be implemented first along the Wood River.

Wetland Restoration

Objective: To restore the majority of the Wood River property to wetland in properly functioning condition dominated by a native plant community. Vegetation management could occur using several methods, including but not limited to water level fluctuations, livestock grazing, haying, planting and seeding, prescribed fire, and mechanical or chemical methods. Vegetation manipulation would be designed to develop species diversity and to maintain healthy and productive stands of native riparian and wetland vegetation. One or two small-scale, reversible pilot projects could be constructed to provide additional information on effects on water quality, effects on wetland habitat, or for research purposes; however these projects would only take up only a very small portion (less than 5 acres) of the property, unlike the pilot projects under Alternative C, which could include a majority of the property.

Wetland restoration would be accomplished through Options 1 and 2 shown in Table 6. Option 1 will be applied to the restoration of the entire property. Internal wetland cells will be designed in such a way that Option 2 could be incorporated on a portion of the south half of the property.

Wetland restoration through the use of a system of 4 to 8 cells, water control structures, and pumps will allow hydrologic control to be maintained on the property. This hydrologic control will allow for greater biological diversity to develop. This system of cells and structures will facilitate a wide array of management options (for example maintaining different water levels in different cells), including periodic aeration of the soil surface. Inter-mixing of waters from the wetland with those of Agency Lake could still be incorporated using this approach on a portion of the wetland.

Special Status Species Habitat

Objective: To manage for a diversity of habitats for special status species (see Table 3). Maintain a viable population of spotted frogs on the property. To protect habitats of federally listed or proposed threatened or endangered species; to avoid contributing to the need to list category 1 and 2 federal candidate, state listed, and Bureau sensitive species.

Management of special status species habitats would also be consistent with the Klamath Falls Resource Area's proposed RMP/Final EIS. If any special status species (federally or state listed as threatened or endangered, federally proposed as threatened or endangered, category 1 and 2 federal candidate, and Bureau sensitive) are suspected in an area proposed for a management activity, field surveys would focus on those species. If populations of these species were found, then the plants or animals and their habitats would be protected through modification or abandonment of management actions as appropriate to eliminate impacts to federally listed or proposed species and to not contribute to the need to list category 1 and 2 federal candidate, state listed, or Bureau sensitive species.

If a project could not be altered or abandoned to eliminate a potential effect on a federally listed or proposed threatened or endangered species, then consultation with the U.S. Fish and Wildlife Service would be initiated under section 7 of the Endangered Species Act.

For state listed and state proposed species, the BLM would coordinate with the appropriate state agency to develop policies that would assist the state in achieving its management objectives for those species.

Fish and Wildlife. Management actions for special status fish species would include removal and movement of portions of existing levees and dikes. Encourage natural processes to form a more sinuous channel with greater habitat complexity in the Wood River and in portions of Sevenmile Creek. The placement of natural structures such as logs and boulders will be considered to achieve desired channel conditions and increase the amount of cover for fish.

Plants. Inventories would be conducted if appropriate habitat is identified. Coordinate and cooperate with the Oregon Department of Agriculture regarding management activities with potentially adverse effects on a state listed or proposed plant species.

Fish and Wildlife Habitat

Objective: To improve habitat conditions for suckers and salmonids; to improve habitat for raptors and neotropical migratory birds; and to optimize waterfowl habitat within the constraints of other resource objectives.

Native tree species would be planted in clumps along major dikes for cover and future nest and perch sites, as well as to mitigate dike erosion. Portions of levees would be planted with native shrubs to provide nesting and roosting areas for neotropical migrant birds. Vegetation management (using water fluctuations, livestock grazing, prescribed fires, mechanical or chemical manipulation, or other methods) could be used to maintain, enhance, or create diverse habitats within the wetland. Riparian habitat along the Wood River and Sevenmile Creek would be restored and maintained by planting riparian vegetation and protection from grazing. River meanders would be encouraged to improve fisheries habitat. Channel morphology and substrate would be studied as they relate to factors limiting fish production, and would be modified as necessary to encourage natural sinuosity and narrow, deep channels.

Nest islands, upland areas, and other structures could be developed to provide wildlife habitat.

Vegetation

Fire Management

Objective: To suppress all wildfires, and to reintroduce fire as an ecosystem process by using prescribed burning as a management tool to support the primary goal of wetland restoration.

An initial attack agreement for suppression of wildfires would be established with the Winema National Forest, U.S. Fish and Wildlife Service, and/or the Oregon Department of Forestry. Parameters would be developed under which fire could be introduced as an ecosystem process to achieve resource management objectives. Prescribed burning could be implemented through planned ignition, as determined by wetland restoration methods; by meeting the other objectives of improving water quality and quantity, and restoring wetland habitat for endangered suckers and waterfowl; and to further research objectives. To mitigate air quality problems, all burning would be conducted during unstable atmospheric conditions and with favorable transport winds.

Noxious Weed Management

Objective: To manage noxious weed species to facilitate restoration and maintenance of desirable plant communities and healthy ecosystems; to prevent introduction, reproduction, and spread of noxious weeds into and within the property; and to manage existing populations of noxious weeds to levels that minimize the negative impacts of noxious weed invasions.

Federal agencies are directed to control noxious weeds on federal lands by the Carlson-Foley Act (Public Law [PL] 90-583) and the Federal Noxious Weed Act of 1974 (PL 93-629). Noxious weed management on the Wood River property would be part of an integrated noxious weed management program as described in the Integrated Weed Control Plan and Environmental Assessment (EA) for the Klamath Falls Resource Area (OR-014-93-09). An appropriate combination of manual, mechanical, chemical, and biological methods, and water level manipulation would be used to control noxious weed species. Seasonal timing would be considered in any control program. Herbicide use would be in accordance with the program design features outlined in the KFRA Integrated Weed Control Plan and EA.

All chemical and some mechanical treatments for noxious weeds would be accomplished through a contract with Klamath County or other appropriate contractors, if populations of these species are identified for control. Appropriate herbicides would be used for treatment of noxious weeds in or adjacent to wetlands. Biological control organisms are supplied and/or distributed by the Oregon Department of Agriculture (ODA) through a memorandum of understanding between the ODA and the BLM's Oregon State Office.

Livestock Grazing

Objective: To use livestock grazing as a vegetation management tool to support the primary goal of wetland restoration, if and where appropriate.

Under this alternative, livestock grazing would be used mainly as a management tool to support the primary goal of wetland restoration. Livestock grazing could be allowed if needed to create or maintain wildlife habitat. No long term grazing lease will be issued. Levels and duration of grazing, as well as maintenance and construction of range improvement projects, would be dependent on the need to meet management objectives. It is expected that the amount of grazing would be significantly less

than that allowed under Alternative A, and it is possible that no grazing would occur. It is estimated that grazing use would not exceed 1,500 animal unit months in any given year. Any livestock use could be authorized and allowed via a competitive bid contract for the purposes of vegetative management and evaluated on a year by year basis. In lieu of or in addition to livestock grazing, haying of portions of the property would be considered as an alternative if vegetative removal was necessary to meet the wetland restoration goals. The allotment would be initially categorized as an "M", or maintain, category allotment under this alternative. The same planning (RMP/EIS) constraints and direction listed under Alternative A would also apply to this alternative.

Cultural Resources

Objective: To protect known cultural resources (including both historic and prehistoric resources).

A class 1 inventory would be conducted on the property. A class 1 inventory is a comprehensive literature search to determine the existence of cultural remains within the project area. A class 3 survey, which is an intensive survey of the ground to identify and record all cultural resource sites within a specific location, would be completed prior to commencing any surface-disturbing activities. An archaeologist (from the BLM and/or Klamath Tribes) would be on-site during these activities to monitor the site. Testing for artifacts could be done, based on surface or stream bank indicators.

Consultation with the Klamath Tribes would occur during the monthly BLM/Klamath Tribes meetings on cultural resources, and at other times, if deemed necessary. This consultation would include updates on existing projects and discussion on new projects anticipated on the Wood River property. Consensus would be sought on all projects.

Recreation

Objectives: To provide opportunities for roaded natural and semi-primitive recreation experiences (opportunities to have a high degree of interaction with the natural environment, to have moderate challenge and risk and to use outdoor skills). To manage the area for low (6 to 10 parties per day) to moderate (10 to 50 parties per day) recreation use levels (moderate near developed sites and roads, and low to moderate in other areas). To manage for day use only.

Recreation use and facilities would be secondary to the overall objective of wetland restoration and water quality improvement. Based on informal recreation use monitoring during calendar year 1994, some trends in recreation use levels have been identified (See Chapter 2, Recreation section). If the current low level of use is desired to be maintained, based on public comments and an informal survey of hunters (Wood River Winter Development Report, Peter Scott, January 1995), then a continuation of the existing restrictions on motorized access is necessary during the hunting season. An improved parking area (graveled or paved) at or near the entrance to the Wood River property, sufficient to hold 20 to 25 vehicles (for peak use periods) would be provided. The facilities provided would meet the roaded natural and semi-primitive recreation opportunity objectives.

In addition to use levels, the BLM would consider user convenience, safety, and resource protection when determining what recreation facilities to provide. Such facilities could include, but are not limited to, improved (graveled or paved) parking areas and roads, toilets, interpretive signing, nature trails (canoe, foot, mountain bike, horseback, and/or ski trails), and a boat ramp to access Wood River (see Map 7). The BLM would coordinate construction activities with the Oregon Department of Environmental Quality, US Fish and Wildlife Service, and the Army Corps of Engineers (among others) when designing and constructing recreation facilities.

The proposed recreation development scenario for the proposed action would be based on maintaining current recreation use levels during waterfowl hunting season and could allow for greater motorized access and increased use levels during the rest of the year. This likely development scenario would include the previously mentioned improved parking area at or near the entrance to the Wood River property, sufficient to hold 20 to 25 cars. In addition, some suitable materials for visually screening the parking area adjacent homeowners would be considered. A toilet, 1 to 2 picnic tables, garbage cans, and interpretive signs could also be provided at the parking area.

During the non-hunting season, better access to the property could be permitted. An improved (graveled) parking area (one quarter acre) near the Wood River bridge, along with a primitive boat ramp (suitable for launching a small boat or canoe) and toilet could be provided. Nature trails could be provided in the vicinity of the Wood River bridge (including canoe trails, interpretive trails along the dikes and newly constructed trails using construction techniques similar to dikes).

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WOOD RIVER WETLAND
Alternative D Conceptual Map
(STREAM OPTION 4, WETLAND OPTION 1 & 2)

Map 7, Alternative D.

LEGEND

NEW DIKES AND
POTENTIAL TRAILS



RIPARIAN/FLOOD PLAIN



WILLOWS/ASPENS/COTTONWOODS



ROAD IMPROVEMENTS



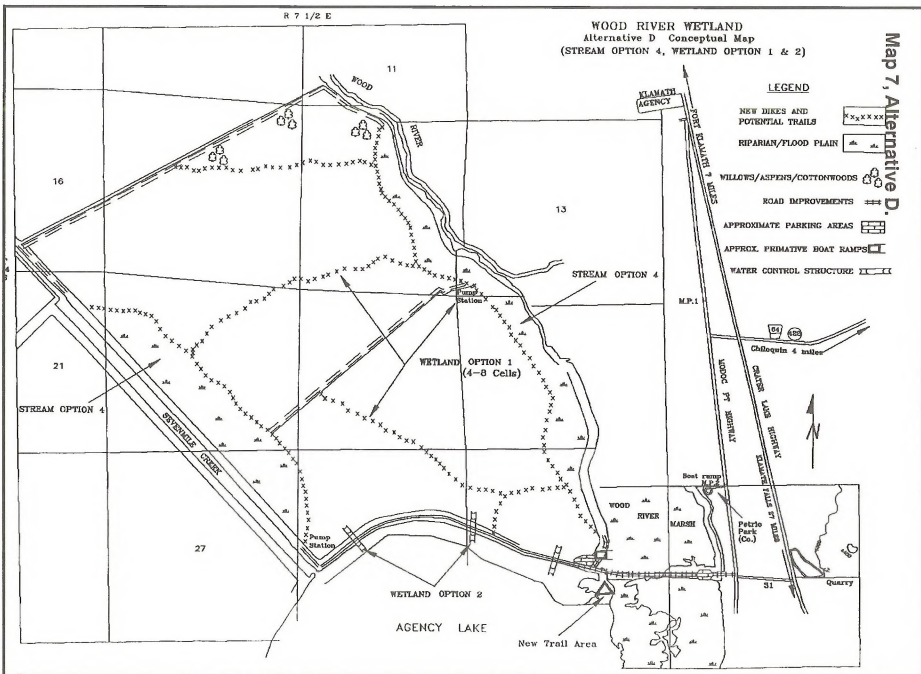
APPROXIMATE PARKING AREAS



APPROX. PRIMITIVE BOAT RAMPS



WATER CONTROL STRUCTURE



The area would be closed to overnight use. No campfires, fireworks, or smoking would be permitted. Off-highway vehicles would be limited to designated, signed roads (this would also include seasonal closures), as determined by use levels and needs.

The location and type of facilities, as well as which roads will be open or closed to motorized vehicles, would be determined as recreation use levels are established and the design and location of stream and wetland restoration projects are defined. Because of the increased recreation management and investment, the area would be identified as a special recreation management area, as required in BLM Manual 1623.

Hunting, fishing, sightseeing, and wildlife viewing would be supported by providing facilities. Hunting regulations on motorized vehicles, such as motorboats, and fishing use would be monitored and coordinated with the Oregon Department of Fish and Wildlife (ODFW); hunting and fishing policies would be developed and/or adjusted based on results of the monitoring data. Safety zones would be established if needed for user safety and wildlife viewing, and shooting would be prohibited in these zones. Jet boats and air boats would be prohibited in the existing Wood River Marsh and in other wetland areas as they are constructed. Limits on speed and wakes would be coordinated with the Oregon State Marine Board and could be recommended to mitigate environmental degradation. Small motorized boats would be allowed to enter the wetland areas, during times when waterfowl nesting is not occurring. The area would be identified as a Watchable Wildlife site in cooperation with the ODFW.

Visual Resources

Objective: To ensure management actions meet VRM Class II objectives.

The property would be managed to meet Visual Resource Management (VRM) Class II objectives, which is to retain the natural character of the landscape, which is a wetland. Changes in any of the basic elements (form, line, color, texture) caused by a management activity should be low. Contrasts are seen, but must not attract attention of the casual observer. Changes must repeat the basic elements found in the predominant natural features of the characteristic landscape. Projects or management actions would be evaluated using the BLM's contrast rating system to measure the degree of contrast between the proposed activity and the natural

features of the landscape, and would meet or exceed VRM Class II objectives (BLM Manual Handbook H-8431-1).

Special Areas

Objective: To manage the property as an area of critical environmental concern (ACEC); and to protect and restore the area's relevant and important values, which are cultural, fish and wildlife values, and natural processes and systems.

The Wood River property was evaluated for designation as an ACEC and found to meet the relevance and importance criteria and evaluation process as described in Appendix G. The Wood River property would be designated an ACEC. The approved Upper Klamath Basin Resource Management Plan/Record of Decision would serve as the management plan for the area.

Mineral and Energy Resources

Objective: To ensure mineral and other activities do not conflict with other management goals, the lands would be withdrawn from (closed to) settlement, sale, location, and entry under the general land laws, including the United States Mining Laws (30 USC Ch. 2 [1988]), but not the mineral leasing laws, subject to valid existing rights. Energy and mineral leases would be subject to a "no surface occupancy" stipulation. The "no surface occupancy" stipulation could be waived if it was demonstrated that the mineral activity was consistent with other management goals. Mineral or energy activity also would be subject to other federal and state regulations, such as the Clean Water Act, Endangered Species Act, etc.

Soil Resources

Objective: To ensure that undue degradation of soils would not occur. Encourage the accumulation of peat.

Management activities would be designed and monitored to meet the soils objective. Studies that determine the potential of peat and peaty soils as pollutant and nutrient filters would be encouraged.

Air Resources

Objective: To meet the goals of the Federal Clean Air Act, as amended; the Oregon Implementation Plan; the Oregon Smoke Management Plan; and to prevent the deterioration of air quality within the Klamath Falls Special Protection Zone (described in the Oregon Smoke Management Plan).

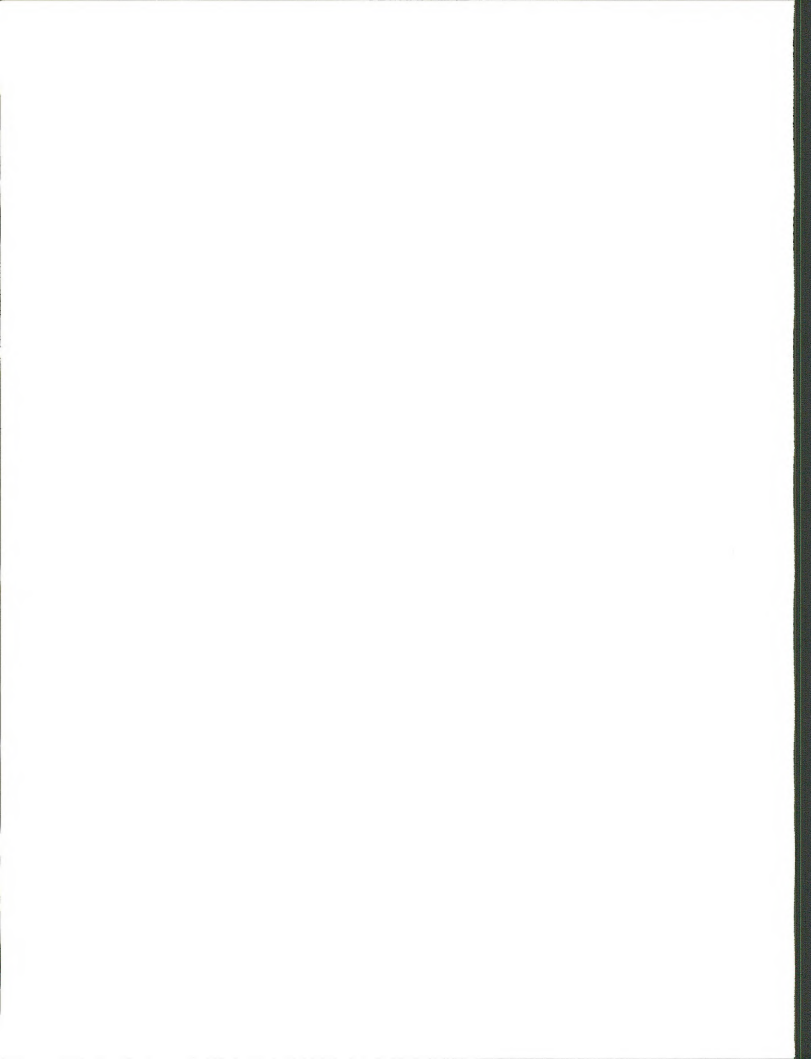
Monitoring of air quality would be conducted as required by regulation and peer practice. Emissions of fugitive dust and smoke would be limited to operations associated with maintenance and restoration activities.

Roads and Facilities

Objective: To provide adequate roads and facilities (quality and quantity) to support management objectives.

Existing easements with adjacent property owners would be recognized and the BLM would follow the terms and conditions of those easements. Roads could be improved (graveled or paved), consistent with overall objectives of this alternative and as determined by use levels and needs. Motorized vehicle use would be limited to improved, designated, and signed roads (this could also include seasonal closures; see Map 7). Exceptions to this would be for people with administrative access or existing easements. Dike maintenance (such as ripping, and planting trees and shrubs) would be accomplished to provide safety to vehicle users and to maintain the integrity of the dikes. The bridge over Wood River would be inspected and maintained according to BLM bridge maintenance schedules (BLM Manual 9112.4).

If necessary to be consistent with overall management objectives of Alternative D, existing facilities, including cattle guards, fences, gates, ditches, bunkhouse shack, corral, and livestock handling facilities could be removed and disposed of in accordance with BLM property procedures (BLM Manual 1527.2 and 1533.2). The pumps and pump house would be maintained, and improved if necessary (see Map 7).



Chapter 4

Environmental Consequences

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Introduction

In this chapter, the positive and negative environmental consequences (effects) of implementing the alternatives depicted in Chapter 3 are defined. The effects of continuing the current management direction (Alternative A) on each resource on BLM-administered land are discussed and compared to the effects of implementing the other alternatives. Each resource discussion begins with assumptions and is followed by the effects of each alternative. If the effects are similar for more than one alternative, the discussion is lumped (such as for Alternatives B and D), rather than repeated for each alternative.

Knowledge about the physical, biological, and socioeconomic relationships discussed in this chapter is not complete, especially when referring to effects from wetland restoration. Because of this and the lack of quantifiable data, most of the effects are not quantified, but rather are described relative to the effects of continuing the existing management direction (Alternative A, No Action). For example, the water quality would continue to deteriorate under Alternative A, but would improve under Alternatives B, C, and D, with the most improvement under Alternative C.

Direct, indirect, and cumulative effects are all considered in each resource analysis, to the extent possible. *Direct effects* result from activities or management actions that are planned or authorized by the BLM under each alternative. *Indirect effects* generally occur when the public takes advantage of opportunities provided by BLM management; examples include hunting, fishing, and other recreational activity, as well as effects on socioeconomic conditions. *Cumulative effects* are those resulting from combined activities on both BLM-administered lands and on other lands, both public and private, over time.

The National Environmental Policy Act requires environmental impact statements to address short-term uses and long-term productivity, irreversible or irretrievable commitments of resources, and unavoidable adverse impacts. These topics are addressed, where relevant, in this chapter. Both short- and long-term time frames were considered. Unless otherwise specified, short term is assumed to be less than ten years, and long term is greater than ten years.

Preliminary analysis, including scoping, indicates that the alternatives would not significantly affect the following: mineral and energy resources, timber

resources, paleontological values, wilderness areas, rural interface areas, or wild and scenic rivers; therefore, those topics are not included in this chapter. Table 7 should be used as a reference throughout this chapter.

A summary of stream channel and wetland restoration options for each alternative is included in Table 7 to assist the reader while reading the effects from the various options. Table 6 in Chapter 3 and Appendix F describe the options more fully.

Assumptions Used in the Alternatives

Funding and personnel would be sufficient to implement any alternative described.

Monitoring (see Appendix 2) would be completed as indicated and adjustments or revisions in management would be made as appropriate.

Alternative A would result in the least surface disturbance from project construction and the most effects from livestock grazing, while Alternative C would have the most surface disturbance from project construction. The types of surface-disturbing activities considered include stream channel and wetland restoration projects, mechanical and chemical vegetation manipulation, road and dike maintenance and improvements, grazing, prescribed fire, and construction of recreation facilities.

Other assumptions are listed at the beginning of each resource section.

Table 7. Stream Channel and Wetland Restoration Options Reference Summary¹

Option	Description	Alternatives			
		A	B	C	D
STREAM CHANNEL RESTORATION OPTIONS					
1	Restore the Wood River by establishing a meandering flow pattern in the Wood River Marsh (outside the dike from the main property's interior).		X	X	
2	Restore wetland by establishing a meandering flow pattern for Sevenmile Creek through the main property's interior.		X		
3	Restore wetland by establishing a meandering flow pattern for Wood River through the main property's interior.		X		
4	Restore meandering flow patterns for the Wood River and Sevenmile Creek by relocating portions of existing levees.				X
WETLAND RESTORATION OPTIONS					
1	Restore wetland by operating the existing canal and pump system.		X	X	X
2	Restore wetland by re-establishing the lake-wetland interface (opening all or portions of the property's interior to prevailing water levels in Agency Lake).		X	X	X
3	Restore wetland supported by inflows from Sevenmile Creek (no pre-defined path) and outflow to Agency Lake.		X		
4	Restore wetland supported by inflows from Wood River (no pre-defined path) and outflow to Agency Lake.		X		
5	Construct and operate small pilot study areas, primarily to refine design details and operating procedures necessary to proceed with intensive wetland restoration and water quality improvement projects on the Wood River property or on other lands.			X	
6	Establish a wetland system/water quality treatment system that is designed to provide the specific flow distribution, retention time, and contact characteristics (vegetation/water contact) that enhance water treatment performance.			X	

¹ See Table 6 for more details.

Environmental Consequences

Effects on Water Resources

Assumptions

Appendix C provides a general overview of the effect that wetlands have on water quality and quantity. Based on the principles outlined in that appendix, the analysis of effects on water resources is dependent upon the wetland functions that would be created or enhanced under each alternative. Certain wetland functions can be considered to have a "life expectancy", for example if the desired function is water quality improvement, the efficiency of water treatment could decline over time in some types of wetlands. To decrease the loss of efficiency, treatment or maintenance could be conducted. Costs for maintaining the efficiency of water treatment would be highest under Alternative C, next highest under Alternative D, less under Alternative B, and the least under Alternative A. Water quality improvements would be least under Alternative A, greater under Alternative B, still greater under Alternative D, and greatest under Alternative C. The rationale for these assumptions is that the most acres in shallow water wetland, with the greatest degree of hydrologic control, will yield the highest quality water. It is also assumed that the more levees, berms, and water control structures an alternative has, the higher the cost of maintenance will be. Water flow and depth, for wetland restoration, would be the most controlled/manipulated under Alternative C (9 to 20 wetland cells), moderately controlled under Alternative D (4 to 8 wetland cells), slightly controlled under Alternative B (2 wetland cells) and least under Alternative A.

Water use for management of the Wood River property would occur according to Oregon State water laws and with the cooperation of the Meadows Drainage District. Until specific and detailed project plans are developed, the exact type and amount of water use cannot be specified, particularly as it relates to the beneficial use of water for the purpose of irrigating a wetland ecosystem. Because Oregon State water law embraces the prior appropriation doctrine ("first in time = first in right") and requires a specific beneficial use of water, changes or modifications to the water rights for the Wood River property could be necessary. These changes and modifications would be made in accordance with Oregon

State water laws and, under these laws, cannot cause harm to water users holding senior (older) water rights.

Alternative A

Chapter 2 outlines existing water quality problems affecting the planning area. Under Alternative A, it is expected that water quality entering the Agency Lake ecosystem from Wood River property would remain unchanged. Nutrients would continue to be exported, due to the drying, irrigation and grazing on the peat soils. Periodic dike maintenance would result in sediment entering Agency Lake, Sevenmile Creek, and Wood River. The effects for maintenance would be minor, and short term in duration. Completion of ongoing studies would provide additional understanding of water quality and quantity in the Wood River system and the Upper Klamath Basin and the processes that influence each. This understanding could lead to improvements in water quality/quantity elsewhere, as the information gathered could provide insights into management and restoration opportunities on other lands.

The sections of Sevenmile Creek and Wood River that are adjacent to the Wood River property would remain in unnatural diked and channelized conditions. Sediment transported from upstream areas would continue to accumulate in these channelized reaches due to the rivers' inability to transport and deposit these materials in appropriate flood plains. This would require periodic dredging to remove the sediment. Dredging would disturb and remove shoreline vegetation and bottom substrate, negatively affect channel and riparian function, and cause short-term water quality degradation.

An opportunity to increase late-season water storage in the Upper Klamath Basin through the creation of additional wetland habitat on the Wood River property would not be realized. However, this alternative would not affect the potential for developing wetland restoration projects elsewhere in the Basin, which could provide similar benefits.

Continuation of grazing emphasis would result in a continuation of sedimentation and fecal pollution with commensurate water quality deterioration. According to Heady (1975), 3,600 animal unit months of cattle use, which was the level of use; in 1994, would produce over 600 tons of manure and 220 tons of urine each year.

Alternatives B, C, and D

The following effects on water resources from vegetation management, recreation activities, and water use would be similar under Alternatives B, C, and D. The level and intensity of effects would be directly proportional to the level and intensity of the management actions. Effects on water resources under Alternative A would be the least. Effects under the other alternatives are compared here.

Vegetation Management. Some types of vegetation management activities, such as livestock grazing, haying, prescribed fire, water level fluctuations, mechanical manipulations, and noxious weed control could result in minor vegetation and nutrient removal. This effect could be offset by nutrients released back into or retained by the wetland system from organic matter, debris from burning, or livestock excrement. Other types of vegetation management activities, such as planting native riparian and wetland vegetation, could decrease dike erosion, resulting in positive effects on water quality. Under Alternative B, no water quality problems associated with cattle-generated waste would occur.

Recreation Activities (including road and dike maintenance). Recreation use (off-highway vehicles, motor boats, vehicular traffic) could cause localized water quality problems (sedimentation, release of nutrients) from direct inputs to water and wetland areas (erosion) and from resuspension of deposited sediment (vehicles stirring up dust, motor boats stirring up bottom sediments). These effects would be expected to be minor, transitory in nature, and dependent on the level, timing, and frequency of recreation use.

Recreation facility construction would need to be carefully designed to mitigate against adverse impacts to water quality, such as sedimentation (from earth moving), chemicals (from paving, painting, toilets), and any disturbances to soils and vegetation that would cause nutrients and toxicants to be suspended and then, possibly, transported into Agency Lake.

Road and dike maintenance would result in disturbance to soils and wetland areas, causing short-term (one to two years) impacts from increased sedimentation and nutrient releases. The net long-term effect would be an overall reduction in sedimentation, due to decreased erosion and damage to roads from recreation and other use.

Effects from recreation activities would be expected to be greatest under Alternative C, moderate under Alternative B; and least under Alternative D.

Water Use. Under Alternatives B, C, and D there could be a net decrease in water use for the Wood River property compared to Alternative A. Under Alternative A, water would be pumped off the property between February and May, and the property would be irrigated from July to October. Under Alternatives B, C, and D only a minor amount of water would be pumped off the property, thereby reducing the need for irrigation later in the year. Evaporation from the wetland could approximate evaporation levels that would occur from Alternative A, as irrigation under the latter spreads water over the ground surface during the warm season. Wenner (1993) hypothesized that, due to the ability of wetlands to store water and provide for late season release of this water (see Appendix C for a discussion of this function), a significant increase in net water storage in the Agency Lake and Upper Klamath Lake systems is possible. For example, current irrigation use could consume up to five acre feet of water per acre per year. Converting the property to wetland would decrease this consumption. Accounting for evapotranspiration of approximately 2.4 acre feet per acre per year from the wetland, there could be a net water "savings" of about 2.6 acre feet per acre per year (Wenner, pers. comm. 1993). Water rights would need to be exercised under Oregon State law and with the cooperation of the Meadows Drainage District.

Alternative B

Appendix C provides a general overview of the effect that wetlands have on water quality and quantity. A modest improvement in water quality entering Agency Lake, compared to that under Alternative A, could result from implementation of this alternative.

Stream Channel Restoration. Effects from any of the stream channel restoration options summarized in Tables 6 and 7 and described in Chapter 3 are uncertain. Factors such as the timing of the construction work and the lake level contribute to the effects of the construction work on surface disturbance and sedimentation. Option 1 would result in the most short term sedimentation from dredging and filling. In Options 2 and 3 the effects would be similar, although less than Option 1. Short term effects associated with sedimentation would be higher under this alternative than under Alternatives C and D, if stream channel restoration Options 2 or 3

were chosen in combination with Option 1. Nutrients and toxicants would be released into Agency Lake due to disturbance of the Wood River Marsh, riparian areas, and main property's interior when constructing the new channels. Water quality entering Agency Lake would be adversely affected from these materials in the short term. Sediment, nutrient, and toxicant levels would decline in a few years as new marsh and riparian vegetation is established and the new floodplain begins to function. This would result in long term water quality improvement.

Any of the stream channel restoration options would provide benefits to groundwater recharge and flood flow retention. Reestablishment of a functioning wetland on the main property could eventually provide groundwater recharge. The groundwater recharge effect is expected to be minor because the Wood River property is located in a groundwater discharge area.

Wetland Restoration. The four wetland restoration options, summarized in Tables 6 and 7 and described in Chapter 3, would affect water resources. As the property is converted to wetland, some nutrients would leach from the soil in the short term (one to two years) due to re-wetting for extended periods of time. However, Wenner (pers. comm. 1993) hypothesized that because oxidation of the peat soils would be greatly reduced, the resulting release of nutrients would also decrease in the short term. Therefore, after equilibrium is reached, the nutrient release should be less than that now occurring during irrigation. As wetland vegetation is established, many nutrients will be held in the wetland system and recycled through successive growing seasons of plant death and decay. Excess nutrients from decaying plant tissues released during the non-growing season will have less effect on downstream waters (Agency Lake), than those released during the growing season under Alternative A (Hammer 1992).

Additional effects from wetland restoration Option 1 on water resources would include shorter pumping periods and less water being pumped from the interior wetland into Sevenmile Creek and the Wood River. Water stagnation problems could be controlled by moving water between the two cells, by pumping water off, or by bringing additional water onto the property. Under Wetland Restoration Option 2, the placement of culverts or other water control structures between Agency Lake and the main property could reduce improvements in water quality if the residence time of water in the wetland were reduced, if uncontrolled exit of nutrients or

sediment from the wetland into the Agency Lake system occurred, or if stagnant water conditions persisted. Option 2 would also allow for water on the south half of the property (approximately 1,460 acres) to intermix with water from Agency Lake. Water levels on this portion of the property could be allowed to fluctuate in response to Agency Lake water levels. Because the surface elevation on the majority of the property appears to have been lowered (through subsidence and other factors) over the past fifty years, Rogers (pers. comm. 1995) hypothesized that those portions of the property open to unregulated influence from the surrounding water bodies would become shallow lakes (5 to 10 feet deep) rather than wetlands or marshes. These shallow lake areas would be less effective at improving water quality than the various wetlands that would otherwise occupy these sites. The area of shallow lake created under Option 2 in this alternative could be as much as 1,400 acres. Under Wetland Restoration Options 3 and 4 the area of shallow lake could be as much as 3,000 acres. In addition, some short-term sedimentation and nutrient releases would result from disturbance of the peat-rich dikes during water control structure installation. Under Wetland Restoration Options 3 and 4, sediment transport residence time and water stagnation problems are unknown; therefore, water quality improvements are unknown.

Under any of the wetland restoration options, some shallow water wetland habitat would develop (more than under Alternative A, and less than under Alternative C and D). Wetland Restoration Option 2 could result in as much as approximately 1,800 acres of this habitat. Wetland Restoration Options 3 and 4 could result in as little as 50 acres of shallow water wetland developing. Conversely, these shallow water areas could result in higher temperatures and lower dissolved oxygen levels in waters that exit the wetland, which in turn could potentially negatively affect water quality in Agency Lake. However, it is not expected that any potential reductions in dissolved oxygen would exceed or even meet the conditions that would occur from continued irrigation practices under Alternative A. Some increases in alkalinity could occur, due to leaching of plant material into the shallow water wetland. The effect of wetland restoration on pH is not known.

Alternative C

Appendix C provides a general overview of the effect wetlands have on water quality and quantity. The greatest improvements in water quality would result from implementation of this alternative compared to the other alternatives.

Stream Channel Restoration. The effects on water resources from Stream Channel Restoration Option 1 would be the same as those described under Alternative B. Based on the amount of new stream channel to be dredged, less short term surface disturbance and sedimentation from stream channel restoration would occur under Alternative C than under Alternative B. Alternative C would have more short term sedimentation than Alternative D.

Wetland Restoration. All four wetland restoration options in Alternative C, summarized in Tables 6 and 7 and described in Chapter 3, would affect water resources. Effects from wetland restoration Option 1 would be that water delivery and drainage of the 9 to 20 wetland cells could be quicker and involve the most precision in achieving specific water levels and habitat responses. Under this alternative, between 50 to 200 acres could be affected by wetland restoration Option 2. This is less than under Alternatives B and D. Therefore, the effects of water from the property's interior intermixing with, and influenced by water levels in Agency Lake would also be less than Alternatives B and D. As the main property's interior is converted to wetland, a short term increase in nutrients could be expected from new berms being constructed and leaching from re-wetting. However, because oxidation of peat soils would be greatly reduced, the nutrient release could also decrease in the short term (Wenner, pers. comm. 1993). Therefore, after equilibrium is reached, the nutrient release could be more or less than that now occurring during irrigation. However, the amount of water pumped from the property into Sevenmile Creek and the Wood River would be significantly less under alternatives B, C, and D than under Alternative A. As wetland vegetation is established, many nutrients will be held in the wetland system and recycled through successive growing seasons of plant death and decay. Excess nutrients from decaying plant tissues released during the non growing season will have less effect on downstream waters (Agency Lake), than those released during the growing season under Alternative A (Hammer 1992).

Because wetland restoration Options 1, 5, and 6 provide the greatest hydrologic control, residence times could be adjusted to optimize water quality treatments. Options 1, 5, and 6 would likely result in the greatest amount of shallow water habitat. The effects related to shallow water habitat would be the same as those discussed under Alternative B. This net nutrient reduction cycle could continue indefinitely. However, short term (up to six months) releases of nutrients and sediment would occur from periodic maintenance of the extensive berm, dike, and ditch system required for this alternative. Vegetation controls and pollutant removal activities will be necessary, and could have similar short term effects.

The effects of wetland restoration Option 5 on water quality parameters and water resources are unknown. It is assumed that although the location of these temporary, small scale pilot projects is currently unknown; the effects would be proportional to the amount of ground affected by them.

Alternative D

Appendix C provides a general overview of the effect wetlands have on water quality and quantity. The improvement in water quality that could result from implementation of this alternative is expected to be greater than Alternatives A or B, but somewhat less than Alternative C.

Stream Channel Restoration. Stream channel restoration Option 4 summarized in Tables 6 and 7 and described in Chapter 3 and Appendix F would be implemented in this alternative. Because stream channel construction would either be limited to a few created meanders along the west bank of the Wood River, or not occur at all, under Option 4, the short term effects of sediment and nutrient delivery to the Wood River, Sevenmile Creek, and Agency Lake are expected to be less than under Alternatives B and C. The intent of this option is to allow the Wood River and Sevenmile Creek to meander across newly widened flood plains driven by the prevailing hydrologic forces. The long term results should be similar to those of stream channel restoration Options 1, 2, and 3; that is, narrower, deeper channels with a riparian zone dominated by wetland vegetation, and banks covered with wetland vegetation and native shrubs and trees.

Wetland Restoration. Wetland restoration Options 1 and 2 would affect water resources. Wetland restoration Option 1 would allow 4 to 8 internal wetland cells that permit allow water levels and therefore vegetative responses to be controlled.

Option 1 would allow for a moderate amount of shallow water wetland habitat (500 to 2,000 acres) to develop. The effects related to shallow water habitat would be the same as those discussed under Alternative B. This alternative could produce more shallow water habitat than Alternative B, but less than Alternative C.

Wetland restoration Option 2 would allow for 100 to 500 acres to intermix with and be influenced by Agency Lake water. Because the wetland cells would be generally larger than those in Alternative C, and smaller than the two cells found in Alternative B, the area intermixing with lake water would likely be more than Alternative C, and less than Alternative B. The effects of this exchange of Agency Lake water over this 100 to 500 acre area would be similar to the discussion found under Alternative B.

Effects on Wetlands

Assumptions

Effects on wetlands include effects on the wetland function, vegetative community, water quality and quantity flowing through the wetland, and the habitat types provided for fish and wildlife. These effects overlap many of the other resources and therefore those sections also should be read and considered to get a complete picture of the environmental consequences on wetlands. Actual stream channel and wetland restoration activities would be similar to those scenarios (options) presented in Chapter 3 and summarized in Tables 6 and 7. Effects on wetlands from restoration described in this chapter are based on those options, and have been analyzed based on the general descriptions of them provided in this document.

Alternative A

The Wood River Marsh would continue to receive sediments and nutrients from upstream and would bind or assimilate a small percentage of each. The proportion of wetland to upland vegetation on the property would remain about the same as what currently exists. Opportunities for wetland rehabilitation and/or restoration would not be pursued; therefore, an increase in the amount of wetlands in the Upper Klamath Basin would not occur. The composition of vegetation would remain the same or, if sediments are accumulated, could trend towards shallower water species. Additional effects on vegetation can be found in that section of this chapter.

Water on the property would continue to be pumped off in the spring so that grazing could continue at significant levels. This would result in a continuation of siltation and fecal pollution with commensurate water quality deterioration.

Alternative B

Based on topographic mapping, it appears that the majority of the property has been lowered as a result of subsidence 3 to 5 feet over the past 50 years. Because of this drop in elevation the majority of the property is between the elevations of 4,134 and 4,137. The levels of Upper Klamath and Agency Lakes vary between about 4,136.5 and 4,143.5. As a result, wetland restoration Options 2, 3, and 4 would likely result in the majority of the property being inundated by 2 to 6 feet of standing water most of the year. The result would be a wetland dominated by open water, with a moderate amount of deep water habitat, and a small fringe of shallow water habitats. Option 1 would allow for maintaining hydrologic control between the two large cells. Under Option 1 the two cells could be managed for different habitats, with the north half being shallower than the south half. The establishment of wetland species would be the result of dispersal from adjacent lands and the soil seed bank. Some planting of riparian and wetland vegetation would occur, but would be limited in extent. These plantings would primarily be along perimeter dikes, to provide habitat for various fish and wildlife species. Periodic treatments of wetland vegetation by prescribed fire and water level manipulation could favor certain species, but are not expected to radically change the dominance of the site by wetland species.

Development of parking or day use areas (see Map 5 in Chapter 3 for approximate locations), if involving any fill work, would require coordination with the Oregon Department of Environmental Quality, the Army Corps of Engineers, and other agencies to obtain the necessary permits. It would also require consultation on mitigation of impacts to the existing wetland areas. All management activities would be designed to minimize their impacts to wetlands and water quality, using state-of-the-art methods. Parking or day use areas could be constructed prior to wetlands restoration to alleviate the need for wetlands mitigation.

Alternative C

It is estimated that a great deal of hydrologic control would be gained by the creation of 9 to 20 wetland cells under Wetland Restoration Option 1. This would allow for a significant amount of habitat diversity with a mixture of shallow water and deep water habitats. Deeper water habitats would likely be located closer to the Agency Lake dike. The least amount of shallow water habitat would be created under Option 2, because it allows the least amount of control over water levels. Options 1 and 6 would result in the greatest amount of shallow water wetland habitat, and likely the highest quality water benefits from the wetland.

Depending on the groundwater table elevation in the project area, various excavation and fill techniques would be used to create specific wetland types. The depth of the excavation would depend on existing seasonal high, normal, and low water table levels. The wetland vegetation diversity would be great, due to various wetland vegetation types planted for study and maximizing water treatment. Because maintenance is expected, the wetland vegetation types established would be periodically disturbed or replaced. This would potentially result in regular changes in species composition and relative abundance, but wetland species would still dominate the site.

Wetland vegetation under Wetland Restoration Options 1 and 2 would result in the establishment of native wetland species by dispersal from adjacent existing vegetation. Periodic treatment of wetland vegetation by livestock, water level manipulation, or prescribed fire would generally serve to maintain the vigor of existing species or could favor dominance of a certain species, but is not expected to radically change the dominance of the site by wetland species. Some planting of riparian and wetland vegetation would occur, but would be limited in extent. These plantings would primarily serve to provide habitat for various fish and wildlife species.

The development of parking areas or day use areas on dike roads, if it involves any fill work, would require coordination with the Oregon Department of Environmental Quality, the Army Corps of Engineers and other agencies to obtain the necessary permits. It would also require consultation on mitigation of impacts to the existing wetland areas. All management activities would be designed to minimize their

impacts to wetlands and water quality, using state-of-the-art methods. Each of the four parking lots proposed under this alternative is expected to be approximately 1/4 acre and could be constructed prior to wetlands restoration and alleviate the need for wetlands mitigation (see Map 6 in Chapter 3 for location of parking areas).

Alternative D

The effects of stream channel restoration Option 4 on wetlands would likely be creation of a linear band of wetland/riparian vegetation between the existing Wood River and Sevenmile Creek channels, and the newly constructed dikes. This flood plain/riparian zone/wetland would vary in size and species composition over time, as the hydrologic forces changed water levels and channel locations. This linear wetland would respond totally to water level fluctuations (flooding, drought, lake level, etc.) and the effects on water quality would also fluctuate.

Wetland restoration Option 1 in the interior portion of the property would allow for greater hydrologic control of water depth, retention time, and wetland vegetative composition than Alternatives A and B, and somewhat less than Alternative C due to the number of cells created. Wetland restoration Option 2 would allow for an exchange of water with Agency Lake, but no control of water levels within those affected areas. The areas affected by this option would likely be smaller than in Alternative B and larger than in Alternative C.

Periodic treatment of wetland vegetation by water level manipulation, livestock, or prescribed fire would generally serve to maintain the vigor of existing species or could change the relative abundance of a certain species, but is not expected to radically change the dominance of the site by wetland species composition. Some planting of riparian and wetland vegetation would occur, but would be limited in extent. These plantings would primarily serve to provide habitat for various fish and wildlife species.

The development of parking areas or day use areas, if it involves any fill work, would require coordination with the Oregon Department of Environmental Quality, the Army Corps of Engineers and other agencies to obtain the necessary permits. It would also require consultation on mitigation of impacts to the existing wetland areas. All management activities would be designed to minimize their impacts to wetlands and water quality, using state-of-the-art methods. Parking or day use areas could be constructed prior to wetlands restoration to negate the need for any permits or wetlands mitigation.

Effects on Special Status Species Habitat

Assumptions

Management activities that affect general fish and wildlife habitat generally also affect special status fish and wildlife species habitat, and activities that affect vegetation could affect special status plant species habitat (if any are found to exist on the property); therefore, those sections contain a more complete picture of the potential environmental consequences and should be read in conjunction with this section.

Alternatives A, B, C, and D

Plants and Animals. Adverse effects on federally listed or proposed species are not anticipated since they would be managed as required by the Endangered Species Act, as amended. Implementation of management actions designed to protect and increase populations of federally listed species, if found, would be expected to result in larger numbers and increased vigor of individuals, and larger sizes and numbers of populations.

Under all four alternatives, no long-term adverse effects on federal candidate, state listed, state candidate, or Bureau sensitive species would be expected because Bureau policy would be to conserve these species through protection of habitats and populations of these categories of species. Effects on Bureau assessment species would be possible if funding or positions do not allow for surveys to detect these species in areas subject to surface disturbing management actions. Effects on Bureau assessment species from management actions could occur at the discretion of management.

Plants. There is no protection provided to special status plants on private lands. However, on neighboring National Forest lands, many of the same species are managed. Modeling to determine minimum viable populations and extinction probability has not been used for special status plant species documented on BLM-administered lands. Therefore, it is not known what percentage of populations could be eliminated and the population still remain viable. If impacts reduced populations below minimum viable levels and the species did not have a sufficient soil seed bank to support rapid recovery, the population would become vulnerable to extinction. If

recovery did not occur, these long-term impacts would result in an irreversible and irretrievable commitment of the resource leading to extinction of the species.

Fish and Wildlife. The effects on special status species would depend on the species and the degree of alteration to their habitats. Impacts to all wildlife species, including some special status species are discussed in the Wildlife Habitat section and are not repeated here. In general, activities that benefit fish habitat would benefit the listed suckers. Bald eagles would benefit by potential nest site development, perch sites, or improvement of prey base. Summering populations of bald eagles would benefit from improved fish populations. Wintering populations of eagles generally hunt wintering waterfowl (mostly puddle ducks and geese), therefore improvement of habitat for puddle ducks and geese would directly benefit wintering bald eagles. Management of habitats for one special status species could have negative effects on other special status species. In order to manage all special status species, the BLM will strive to maintain or create a variety of habitats within the constraints of the environmental parameters of the site.

Effects on Fish and Wildlife Habitat

Assumptions

Fish habitat would be increased if meander patterns were recreated for Wood River and Sevenmile Creek; however, that method of stream restoration would have the greatest short-term negative effects on fish from the increased disturbance, sediment load, and changes in migration patterns.

Maintenance of dikes and dike roads under best management practices (such as using large rip-rap and establishing a woody riparian zone at the base of the rip-rap) would reduce sedimentation from the dikes, which would benefit fish. The stabilization of the dikes would allow better vegetation structure along the dikes, and would benefit suckers and other fish. This vegetation structure would also benefit bird and mammal species that prefer these riparian zones. The large rip-rap would provide cavities and denning sites for many mammals, such as otter, mink, and weasels. However, the improvement of

dikes could reduce the amount of shallow exposed mudflats that are now available at the base of some dikes, which are used by shorebirds. These impacts and benefits would be consistent throughout the alternatives.

Noxious weeds will be treated. Negative impacts to wildlife habitat would be destruction of certain habitats during control procedures. Mechanical or chemical procedures could destroy some non-target species. This effect is expected to be minimal because treatment areas usually would be small and widely scattered. On the other hand, these small treatment areas would create habitat diversity in the large units. Small areas of treatment would create pockets of early seral conditions in wetland habitat.

Alternatives A, B, C, and D

The ratio of wetland/marsh to upland grass/meadow habitat would remain the same under Alternative A and would increase under Alternatives B, C, and D. The greatest amount of shallow water habitat could be created under Alternative C, due to the abundance of berms and containment structures being constructed. The greatest amount of deep water habitat would be created under Alternative B, based on the potential wetland restoration methods proposed. Alternatives C and D would have the highest amount of control to manipulate water levels within the wetland area and therefore the ability to direct water levels and vegetation towards desired habitat conditions.

Alternative A

Continued periodic dredging of the Wood River would adversely affect fish habitat as bottom conditions (substrate) would continue to be made up of fine sediments, which are not conducive to spawning for most fish species. Quality and quantity of vegetation along edges of the stream, which is needed for escape cover, would also be continually disrupted. This lack of edge vegetation in shallow water habitat could have a negative effect on larval suckers during their emigration from spawning areas.

Wetland restoration would not take place, and the proportion of wetland to meadow habitat would remain constant; water would continue to be pumped off the property in the spring, and livestock grazing would continue at current levels. Therefore, the majority of the property would continue to be comprised of upland grass and meadow communities. Species that prefer these habitats, such as ground squirrels and ground dwelling birds, would continue

to prosper with this alternative. Implementing various grazing systems, such as pasture rotations, would provide some areas with taller vegetation. This would be favorable to birds, such as puddle ducks, shore birds, and blackbirds which prefer to nest in meadow areas with taller vegetation. The taller vegetation would also improve the existing meadow habitat for small mammals (such as mice and ground squirrels). This in turn would benefit raptors and mammals that feed on small mammals.

Protecting the riparian zones from grazing would improve the vegetation communities in these areas. This would benefit species that use this habitat. Riparian habitat would be restricted to existing berms and dikes and existing Wood River and Sevenmile channel banks. Alternatives B, C, and D would have a higher quantity of riparian habitat since these alternatives include channel restoration and the widening of Riparian areas.

Due to the potential increase in public use and the area's closure to motorized vehicles, there could be an increase in foot traffic along the main dike road. This would increase disturbance to nesting neotropical birds in this area. The stand of cottonwood trees along this road probably contains the highest density of neotropical birds on the property. In the past, most traffic has been in vehicles which pass quickly and time of disturbance is short. Often birds get accustomed to this type of disturbance. Pedestrians move slowly and wildlife often is more disturbed by a person on foot than in a vehicle. The pedestrian traffic would be greatest under Alternatives A and D. Even though there may be more visitors under the other alternatives, the disturbance would be less since most traffic would be in cars and would pass quickly.

Hunting and fishing use is likely to increase under Alternative A although this increase is likely to be less than for all other alternatives. Resulting changes in harvest levels and disturbance of fish and wildlife species may necessitate adjustments in hunting and fishing regulations and the exercise of controlled use in coordination with Oregon Department of Fish and Wildlife (ODFW).

Alternative B

Stream channel restoration or reconstruction that establishes meanders would improve the amount and type of fish habitat. Reestablishing meanders in the stream would allow natural hydrologic processes to create a narrower, deeper channel with increased sinuosity and aquatic habitat diversity. Improved channel hydrology will cause bottom substrate

composition to shift from a sand/silt bottom to one which includes gravel and cobble sized materials. Floodplain and riparian edges will function to deposit fine sediments from the water column. Larger sized substrate elements combined with improved riparian areas and increased habitat complexity will improve the quantity and quality of rearing and refugial habitat for suckers and salmonid fish. The amount of potential fish spawning habitat may increase. Overall aquatic ecosystem function would improve under this alternative.

The effects of wetland restoration on wildlife would be based on final vegetation patterns which would be affected by how restoration is accomplished overall. Use of the marsh by diving ducks, otters, muskrats, and other wildlife would be higher under this alternative than under the other alternatives due to the depth of water. There would be a shift in use patterns for species such as white-fronted geese, migrating waterfowl, and various raptors. Under this alternative, geese and migrating waterfowl would use the property as a resting area in spring and fall, whereas under Alternative A, the area would be used as a feeding area, and the waterfowl would use the main lake or open water for resting. Species that prefer upland or short grass (meadow) habitat could be significantly adversely affected by the change in habitat on the Wood River property. Raptor use would change because of the prey species available. Use by rough-legged and redtail hawks in the winter could decrease due to the reduction in small mammals present. Use by ground dwelling birds, such as meadowlarks and sparrows, would be less under Alternative B than other alternatives due to the change from a meadow to wetland community.

Changing stream flow patterns could also affect wildlife use. Changing inflows without a predefined path could have negative effects on migrating fish. Juvenile fish moving downstream may not be able to survive if they become trapped in wetland areas and succumb to poor water quality (high temperatures, low dissolved oxygen) before finding a path to the lake. Diversion of flows from existing channels may cause upstream migration barriers for adfluvial spawning fish (reside in lakes and migrate to streams to spawn).

Manipulating water levels on the property with the existing canal and pump system would allow control in development of desired vegetation communities and maintenance of desired water levels. This may prove beneficial in maintaining critical habitat for special status species. Installation of water control structures in existing dikes could affect water quality (temperature regulation, and dissolved oxygen) on

the newly flooded wetland. This could improve conditions for fish and result in increased use by trout, Lost River and shortnose suckers, especially in areas with flowing water. The zone between the lake and the wetland area is important to suckers and installation of water control structures would increase access to this kind of habitat. The water control structures would allow increased movement by animal species. Aquatic species such as muskrat and fish, would benefit from these passage ways. More mobile species, such as birds or otters, and their ability to colonize new areas would not be affected by the culverts. The newly created wetland would benefit the spotted frog (federal candidate species). However, if bullfrogs are present in the Wood River the addition of water control structures could allow them to enter the area and displace the resident population of spotted frogs.

Placing logs or trees in streams or channels would improve channel complexity and hiding cover for fish.

Clumps of trees (willows, aspen, and cottonwood) would be planted under this alternative so potential neotropical migratory bird and raptor habitat would be more abundant than under Alternative A, but less than under Alternatives C or D. Creating shrub communities on the dikes would have more benefits to neotropical migrants under Alternative B than under Alternative A. Alternative B would be less favorable than Alternative C or D because of the fewer dikes for potential shrub habitat.

Due to the increased amount of access under this alternative, there could be more potential disturbance to wildlife from recreational users. Recreation development would have minimal effects on habitat, but would attract more people to the area and create more potential disturbance than under Alternative A and D, but less than under Alternative C. Development of recreational facilities and improvement of roads would tend to concentrate disturbances to wildlife.

Hunting and fishing use is likely to increase under Alternative B. Increases would be expected to be greater than Alternatives A or D and less than Alternative C. Resulting changes in harvest levels and disturbance of fish and wildlife species may necessitate adjustments in hunting and fishing regulations and the exercise of controlled use in coordination with Oregon Department of Fish and Wildlife.

Removal of corrals and buildings from the property would eliminate some of the existing perch sites from the area. These sites are used for hunting perches (for example raptors or bluebirds), territorial displays (meadowlarks), loafing areas (neotropical birds), and nesting (swallows).

Mowing and haying could create wildlife habitat diversity and be limited to specific areas.

Use of fire as a management tool would generally have a short-term negative impact, because of destruction and elimination of habitats. However, impacts over the long term generally would be beneficial because of the creation of vegetative diversity within a large ecosystem. Fire is a natural process that historically provided diversity and redistributed nutrients throughout the basin by burning and dissipating them through smoke and ash.

Alternative C

Because of the various wetland restoration options proposed, Alternative C would create a greater variety of habitats than under the other alternatives. Since high maintenance wetland systems would be allowed, the variety of habitats could be maintained. This alternative could also allow for specific species management in various portions of the property (for example, manage for spotted frogs in one area, yellow rails in another area). Management of critical habitats for these species could be developed and monitored closely.

Effects on wildlife from water treatments would vary based on design of water treatment and desired outcome. If deep water and dense vegetation were desired to reduce the amount of nutrients in the water, then wildlife, such as muskrats, tri-colored blackbirds, and bitterns would be positively affected; shorebirds and those using more open water, such as terns and osprey, would be negatively affected. Projects would still be more beneficial to these open water species than under Alternative A, however.

In general, the addition of water control structures would benefit wildlife because they would allow the management of a variety of habitats or the ability to manage a specific water level to benefit certain species. This flexibility would be greater under this alternative than under Alternatives A or B.

Intensive development of wetland cells would result in more rapid development of wetland habitats. This would be more beneficial in the short term than under Alternative B, and similar to Alternative D since the development under Alternative B would take longer. Also, planting and seeding of various wetland plants would be more beneficial under this alternative than B. Lack of seed source could preclude these plants from becoming established in Alternative B. Establishment of these plant communities would not be possible in the majority of the Wood River property in Alternative A.

Due to the variety of habitats that would be available under this alternative, the impacts to wildlife would be moderated. There would be an increase in use by wildlife preferring deeper water. This increase would be more than Alternative A, but may not be as much as Alternative B. The reduction in grassland/ meadow habitat would be less than Alternative B, but since grassland communities would be better developed (less grazing) than Alternative A, the reduction of wildlife in these habitats would be minimal.

Restoration of stream channels would have the same benefits as discussed under Alternative B. Since the amount of channel restoration is less under Alternative C, the benefits would be less than Alternative B or D, but more than Alternative A.

Placement of structures in the streams would benefit fish by creating more hiding cover and hydrologic complexity. Under this alternative a variety of structures, both natural and artificial could be used. Structures, of various types and configurations can provide hiding cover for fish structural complexity, and encourage the development of spawning and foraging substrate. This alternative has a high degree of flexibility in allowing for a variety of structure materials including artificial structures, such as concrete blocks and gabion. This would allow more opportunities for structures to be placed in streams, which would provide an escape cover in more areas than in Alternatives A, B, or D.

Wildlife habitat developments proposed under this alternative, raptor perches and nest structures for waterfowl and blue birds, would benefit these species. These benefits would be more under this alternative than under Alternatives A, B, or D. As new management techniques are developed, they could be applied under this alternative. Some of the techniques, such as artificial nest structures or exotic vegetation management, could be precluded under Alternatives A, B, or D.

Removal of corrals and buildings from the property would eliminate some of the existing perch sites from the area. These sites are used for hunting perches (for example raptors or bluebirds), territorial displays (meadowlarks), loafing areas (neotropical birds), and nesting (swallows).

Creating shrub communities on the dikes would have benefits to neotropical migratory birds. Since there would be more dikes created under this alternative, the potential benefits would be greater than Alternatives A, B, and D. More clumps of trees would also be planted under this alternative.

Due to the increased amount of recreational development there would be the greatest potential for disturbance from recreational users under this alternative than under the other alternatives. Recreation developments would have minimal effects on habitat, but would attract more people to the area and create more potential disturbance to animals. Development of recreational facilities and improvement of roads would tend to concentrate or localize disturbances to wildlife.

Hunting and fishing use is likely to increase under Alternative C. Increases would be expected to be highest out of all the other alternatives because it allows for the highest amount of access and recreation developments. Resulting changes in harvest levels and disturbance of fish and wildlife species may necessitate adjustments in hunting and fishing regulations and the exercise of controlled use in coordination with Oregon Department of Fish and Wildlife.

Livestock grazing could be used as a tool for vegetative management under this alternative. Effects on wildlife habitat would depend on the level (intensity) of grazing. In general, livestock grazing could create habitat diversity. Mowing and haying would also create diversity. Since this alternative has more cells or units, all these tools could be used more intensely and effectively.

Use of fire could also be more controlled and used more intensely under this alternative than under Alternative B.

Alternative D

Restoration of meanders in stream channels would be accomplished by allowing the Wood River and Sevenmile Creek to cut new channels 50 to 400 meters interior of existing dike structures. This alternative leaves open the option of accelerating

channel formation by engineering a naturally functioning stream course within a new containment structure. These beneficial effects would be comparable to Alternative B, but more than Alternatives A or C due to the amount of channel work that could be done.

Reestablishing lake/wetland interface would have the same impacts as discussed under Alternatives B and C.

Placement of materials in the stream for fish habitat would have similar effects as Alternatives B and C.

Planting trees and shrubs on the dikes would have similar benefits for neotropical birds under this alternative as compared to Alternative B, but less favorable than Alternative C because of the fewer dikes for potential shrub habitat.

Removal of corrals and buildings from the property would eliminate some of the existing perch sites from the area. These sites are used for hunting perches (for example raptors or bluebirds), territorial displays (meadowlarks), loafing areas (neotropical birds), and nesting (swallows).

Recreational development would be more carefully designed to the users needs after monitoring determines what level of development is needed. By carefully monitoring type of uses, development could then be more carefully planned to avoid wildlife conflicts. Recreational impacts to wildlife would be less under this alternative than Alternative C.

Hunting and fishing use is likely to increase under Alternative D. Increases would be expected to be similar to Alternative B because it allows for a moderate amount of recreation development. Resulting changes in harvest levels and disturbance of fish and wildlife species may necessitate adjustments in hunting and fishing regulations and the exercise of controlled use in coordination with Oregon Department of Fish and Wildlife (ODFW). The creation of wetland cells could allow the management of more diverse habitats and the flexibility to manage for different species at the same time. These options would be less than that allowed in Alternative C, but more than proposed in Alternatives A or B.

The benefits of vegetative management activities (such as grazing, mechanical, and fire) would fall between Alternatives B and C.

Effects on Vegetation

Assumptions

Effects on vegetation are analyzed in terms of the relative abundance of species within plant communities, the relative distribution of plant communities, and the relative occurrence of seral stages of those communities. Effects on vegetation would result from wetland restoration and stream channel restoration options (summarized in Tables 6 and 7 and described in Chapter 3), livestock grazing, planting, fire management, nutrient regimes, and recreation facilities and road maintenance.

Hydrologic regimes (water depth, length of inundation, and season of inundation) would affect vegetation composition structure, and relative abundance of species.

Planting includes seeding or planting of native or exotic plant species to promote establishment of desired wetland and/or riparian vegetation to provide additional forage for wildlife or domestic livestock, to provide habitat features for wildlife, and/or to stabilize disturbed areas. Planting would affect the local composition of plant communities immediately after the plantings. Relative abundances of species would be affected by the species selected for planting and the reproductive potential of those species. Long-term changes in species composition and relative abundance of species in the various seral stages of vegetation succession could result from changes in nutrient cycling regimes from extensive use of nitrogen fixing species (for example, legumes) in the plantings.

Fire management would affect both species composition and relative abundance of species in plant communities. These effects would vary relative to fire behavior parameters such as intensity, rate of spread and fuels consumption which in turn are related to fire management prescriptions for fuel moisture, temperature, relative humidity, and wind speed.

Nutrient inputs associated with livestock use and projects that include fertilization in their design could change *nutrient regimes* and thereby impact the species composition and relative abundance of species in aquatic vegetation. Runoff from these management activities could elevate nutrient levels in aquatic habitats which would favor expansion by

native species adapted to those conditions, such as cattails, and/or the invasion of similarly adapted exotic pest species, such as purple loosestrife.

Construction of recreation facilities and road maintenance would not be expected to influence the overall character of the vegetation. However, disturbance associated with these construction and maintenance activities would provide conditions to which some species, including noxious weeds, would have a competitive advantage over other species. Also, if additional fill material is required, there would be the potential for the introduction of reproductive material of noxious weeds from outside the Wood River property.

Effects on special status species habitat are addressed in that section of this chapter.

Alternative A

Riparian vegetation along the channelized Wood River would maintain its current distribution and abundance, with some additional protection provided by federal ownership (see the Riparian section of Chapter 3). Vegetation of the main property's interior would remain dominated by the upland grasses, annual forbs, and weedy species (including noxious weeds) characteristic of the property's current condition (Chapter 2 and Appendix E).

The effects of nutrient regimes (see Assumptions at the beginning of the section) would be most intense with the high carrying capacity and long season of use for livestock under Alternative A. The effects of recreation facilities and road maintenance would be the least because little or no recreation facilities would be provided and only minor maintenance would be done.

Alternative B

Stream Channel Restoration. Historic meandering stream courses would be restored for the Wood River through the BLM-administered portion of the Wood River Marsh (Stream Channel Restoration Option 1) and within the interior of the main property (Option 3), and for Sevenmile Creek within the interior of the main property (Option 2). The meandering patterns and additional channels would increase the length and the resultant area of land occupied by riparian associated vegetation relative to Alternative A. Weed management activities and limitation of further disturbances would be expected to facilitate establishment of a native riparian plant community.

Wetland Restoration. Short-term effects on vegetation would be the least from Wetland Restoration Option 1 in this alternative (2 cells). Wetland Restoration Options 2, 3, and 4 could require highly engineered techniques initially, but would be designed to require minimal maintenance in the long term. Native wetland species, such as tufted hairgrass, sedges, rushes, bulrush, and cattail (Appendix E), would become more abundant, dense, and widespread on the property. At the same time, both native and introduced upland and weedy species, such as cheatgrass, quackgrass, thistles, mullein, and salsify, would become less abundant, dense and widespread on the property. Mechanical disturbance from Options 2, 3, and 4 would create conditions in the short term to which many noxious weeds would have a competitive advantage over other species. However, the minimum maintenance required in the long term would minimize disturbance and allow the development of native dominated plant communities similar to those characteristic of particular sites before conversion of wetlands to pasture, given the frequency and intensity of natural disturbance events. The dominance of these communities would reduce the structural and seral diversity within the property, but would provide the structural components and relative species composition lacking in the landscape.

Hydrologic Regimes. Hydrologic patterns would be managed to resemble those that occurred on the property before conversion of the wetlands to pasture. Therefore, native species adapted to the amounts of water occurring during seasons and for periods of time determined by precipitation patterns and seasonal variations in water flow would have a competitive advantage over other species. Native dominated plant communities would result with species compositions and relative species abundances similar to plant communities that existed before conversion of wetlands to pasture, given the frequency and intensity of natural disturbance events.

Livestock Grazing. Livestock grazing would not be used to achieve specific management goals, thus disturbance from livestock use would not occur.

Planting. The scale of the effects of planting (see Assumptions) would vary across the alternatives relative to the number of acres that would be subjected to these treatments, but would generally be the least under Alternative B (planting would not occur under Alternative A).

Fire. Fire would be reintroduced as an ecosystem process that would promote the development of native plant communities characteristic of particular sites before conversion of wetlands to pasture. Generally, prescribed fire prescriptions would allow for burning during the fall which would more closely imitate the natural fire cycle to which native species are adapted. Species composition and relative abundance of species in plant communities would be affected by favoring species that have phenological cycles (see Glossary) that enable them to persist or reproduce successfully after a late summer or fall fire.

Nutrient Regimes. The effect on nutrient regimes (see Assumptions) would generally be a reduction in nutrient inputs to aquatic habitats due to the exclusion of livestock grazing. Extensive fertilization would not occur, minimizing the effects of nutrient runoff from this source.

Recreation Facilities and Road Maintenance. The scale of the effects from recreation facilities and road maintenance (see Assumptions) would vary across the alternatives relative to the number of developments and extent of maintenance planned for the area. These effects would be greater than under Alternative A and D, but less than under Alternative C.

Alternative C

Stream Channel Restoration. Historic meandering stream courses would be restored for the Wood River only through the BLM-administered portion of the Wood River Marsh. The meandering pattern would increase the length and the resultant area of land occupied by riparian associated vegetation relative to Alternative A, but the area occupied by riparian vegetation would be less than in Alternative B, because of its Stream Channel Restoration Options 2 and 3. The disturbance associated with restoration activities would provide conditions to which many noxious weeds would have a competitive advantage over other species, but this would occur over less area than in Alternative B. Again, weed management activities and limitation of subsequent disturbances would be expected to facilitate establishment of a native riparian plant community.

Wetland Restoration. Wetland Restoration Options 1, 2, 5, and 6 (summarized in Tables 6 and 7) would promote native wetland species, such as tufted hairgrass, sedges, rushes, bulrush, and cattail, to become more abundant, dense, and widespread on the property. At the same time, both native and

introduced upland and weedy species, such as cheatgrass, quackgrass, thistles, mullein, and salsify, would become less abundant, dense, and widespread on the property. However, the disturbance associated with Options 5 and 6 could create conditions to which many noxious weeds would have a competitive advantage over other species. Options 5 and 6 would also result in diversity of seral stages of wetland vegetation, and the relative species abundances characteristic of those seral stages including some areas with native dominated plant communities similar to those characteristic of particular sites before conversion of wetlands to pasture.

Hydrologic Regimes. Wetland Restoration Options 2, 5, and 6 could result in hydrologic patterns that would differ from those determined by precipitation patterns and seasonal variations in water flow. Plant species adapted to these patterns would have a competitive advantage over other species, and species composition and relative abundance would differ from that under Options 3 and 4 under Alternative B. These species could include exotic (introduced) species, including noxious weed species.

Livestock Grazing. Livestock grazing would be used only to achieve specific management goals, thus minimizing disturbance from livestock use to promote the development of native dominated plant communities. These communities would be similar to those characteristic of particular sites before conversion of wetlands to pasture, given the frequency and intensity of natural disturbance events.

Planting. The scale of the effects of planting (see Assumptions) would vary across the alternatives relative to the number of acres that would be subjected to these treatments, but would generally be the most under Alternative C.

Fire. Prescribed fire would be applied according to the goals and design of various experimental management regimes. Species composition and relative abundance within plant communities would be affected by favoring species that have phenological (see Glossary) cycles that enable them to persist or reproduce successfully after a fire occurring under the prescribed conditions and season.

Nutrient Regimes. The effect of nutrient regimes on vegetation (see Assumptions) would result from a reduction in nutrient inputs to aquatic habitats due to the limited use of livestock grazing proposed. Experimental fertilization could be used, possibly affecting aquatic habitats, depending on the level and extent of the fertilizer application.

Recreation Facilities and Road Maintenance. The scale of the effects from recreation facilities and road maintenance (see Assumptions) would vary across the alternatives relative to the number of developments and extent of maintenance planned for the area. These effects would be greatest under Alternative C, since the greatest level of activity would occur under this alternative.

Alternative D

Stream Channel Restoration. Stream Channel Restoration Option 4 would allow natural processes to establish wider riparian areas along Wood River and possible Seven Mile Creek, and to increase channel sinuosity in those areas. The meandering pattern that would develop and would increase the length and the resultant area of land occupied by riparian associated vegetation relative to Alternative A, but the area occupied by riparian vegetation possibly would be less in Alternative B. The disturbance associated with restoration activities would provide conditions to which many noxious weeds would have a competitive advantage over other species, but this would occur over less area than in Alternative B. Also, if additional fill material would be required, there would be the potential for the introduction of reproductive material of noxious weeds from outside the ranch area. However, weed management activities and limitation of further disturbance would be expected to facilitate establishment of a native riparian plant community.

Wetland Restoration. Within the new dikes constructed as part of Stream Channel Restoration Option 4, wetland restoration activities would be similar to Alternative B, but with four to eight cells instead of two. Therefore, the mechanical disturbance from the initial restoration activities would be greater than under Alternative B, but less than under Alternative C. Consequently, the conditions to which many noxious weeds would have a competitive advantage over other species would be created over a larger area initially than in Alternative B. Otherwise, the effects on vegetation within the dikes due to wetland restoration would be similar to those under Alternative B.

Hydrologic Regimes. A majority of the area within the dikes would support hydrologic patterns that would resemble those that occurred on the property before conversion of the wetlands to pasture, as determined by precipitation patterns and seasonal variations in water flow. These areas would support species compositions and relative species abundances similar to Alternative B. In other areas,

hydrologic patterns would be managed differently from those determined by precipitation patterns and seasonal variations in water flow, and would result in a vegetation with species composition and relative abundance that would differ from that on the rest of the property.

Livestock Grazing. Effects from livestock grazing would be similar to those described under Alternative C.

Planting. The scale of the effects of planting (see Assumptions) would vary across the alternatives relative to the number of acres that would be subjected to these treatments, but would generally be greater than under Alternative B and less than effects under Alternative C (planting would not occur under Alternative A).

Fire. Fire would be reintroduced as an ecosystem process that would promote the development of native plant communities characteristic of particular sites before conversion of wetlands to pasture over most of the area. Some prescribed fire could be applied according to the goals and design of the an experimental management regime. Therefore, over much of the property, fire effects on vegetation would be similar to those under Alternative B. However, in some areas where experimental methods were applied, species composition and relative abundance within plant communities would be affected by favoring species that have phenological (see Glossary) cycles that enable them to persist or reproduce successfully after a fire occurring under the prescribed conditions and season.

Nutrient Regimes. The effect on nutrient regimes (see Assumptions) would be the same as that under Alternative C.

Recreation Facilities and Road Maintenance. The scale of the effects from recreation facilities and road maintenance (see Assumptions) would vary across the alternatives relative to the number of developments and extent of maintenance planned for the area. The scale of these effects would be determined through monitoring of recreation use and needs. Based on the likely recreation development scenario described in Chapter 3, it is anticipated that the effects would be less than those under Alternative B, but greater than those under Alternative A.

Effects on Noxious Weed Management

See Effects on Vegetation section.

Effects on Livestock Grazing

Assumptions

For comparative impact analysis purposes, the maximum potential grazing capacity of the entire Wood River property was assumed to be 7,200 animal unit months in the draft Resource Management Plan/Environmental Impact Statement. This is the maximum amount leased since the BLM has been involved with the property and is the approximate amount of use made by the previous owners livestock. However, the maximum grazing use on the Wood River property, under BLM control, would be less than recent levels under all of the alternatives. Observations of grazing use made since the BLM's involvement in the property indicate that the maximum levels of use the Bureau could lease the property for, under Alternative A, would be 3,600 animal unit months. Under all of the alternatives, the BLM would more strictly control, direct, and stipulate the grazing use, compared to what has occurred in the past. This is due to the mandates and requirements of various federal laws, policies, and regulations that the BLM operates within. The BLM also has general objectives, standards, and guidelines for grazing that preclude managing land solely for maximum livestock production.

Alternative A

Implementation of this alternative would result in a continuation of impacts similar to those that have occurred in the past, but to a lesser degree, as explained in the assumptions. Many of the effects from continued intensive livestock grazing are covered in the Effects on Water Resources, Wetlands, Soils, Vegetation, Fish and Wildlife, Recreation, and Visual Resources sections for Alternative A. Please refer to those sections for additional impact analysis.

Regulations and policies of the BLM preclude grazing public land at levels higher than its sustained yield capacity. Observations made during and after the 1993 and 1994 grazing use, have indicated that more acceptable BLM maximum stocking levels for

the property would be 3,600 animal unit months. Future rangeland monitoring studies and resultant evaluations of that monitoring data, could result in changes downwards in authorized grazing levels. This could be a negative or positive impact depending on perspective and the levels of related benefits to other resources and values from that reduction.

Alternative B

Under this alternative, livestock grazing would not be allowed on the property and would not be considered as a management tool in the future. The economic impacts of this alternative, as well as other impacts related to not grazing, are covered in the following discussion of Alternatives C and D. The loss of grazing as a potential tool for vegetation manipulation would be considered a slight negative impact, in that using cattle can be a cost effective method for repressing or otherwise altering vegetative attributes.

Alternatives C and D

Livestock grazing would be used solely as a management tool to support other goals, and as a tool may never be used. Grazing systems, levels, and duration would be dependent on the need to meet management objectives. It is expected that livestock grazing use under Alternatives C and D (750-1,300 maximum animal unit months, respectively) would be a fraction of the grazing listed in Alternative A. It is expected that the maximum grazing use will rarely or never be reached.

The primary effect on livestock grazing from implementation of Alternatives C and D would be a dramatic reduction in grazing use from historic levels.

With reduced or no grazing, there would be no need to prepare an allotment management plan or conduct other administrative activities related to livestock grazing. This could result in a reduction of federal expenditures.

Effects on Cultural Resources

Assumptions

Cultural resources would be monitored and protected during construction and other surface-disturbing activities.

Alternative A

Under this alternative, livestock grazing may affect both concealed and known cultural resource sites by trampling. Fluctuating water levels and the continued use of motorized boats on the river could cause erosion damage to stream bank sites. Recreation use provides opportunity for both intentional and unintentional, unauthorized, artifact removal (pot hunting). Sites are often destabilized due to natural processes, therefore, a monitoring program to assess the effects of these processes on sites, was identified in the monitoring plan.

Alternatives B, C, and D

Stream channel restoration methods could require extensive earth moving to recreate the historic meandering channels of both Wood River and Sevenmile Creek, potentially causing damage to or destroying cultural sites and resources. Surface testing, regular monitoring by an archaeologist, data recovery, and site preservation measures would mitigate this potential damage. Positive effects on cultural resources from this restoration work would include discovery of new sites and artifacts that could enhance the knowledge base of cultural resources in the area.

Various vegetation management methods could adversely affect cultural resources. Increased fluctuations in water levels causing alternative wet/dry periods, which could occur under some of the wetland restoration options, would cause disintegration of perishable resources, such as artifacts made from reeds. A data recovery program could mitigate such an effect. Prescribed burning could destroy plant fiber and/or wood artifacts. This would be an irretrievable commitment of resources. Burning also leaves carbon behind, complicating carbon-14 dating tests to determine the age of a cultural resource or site.

Increases in recreation use could also adversely affect cultural resources. Recreation use provides an increased opportunity for both intentional and unintentional, unauthorized, artifact removal (pot hunting). Under Alternatives A, C, and D, livestock grazing may affect both concealed and known cultural resource sites by trampling. However, trampling under past use was significantly higher than that proposed under these alternatives. Alternative B would allow no grazing and would therefore not have this type of effect. Fluctuating water levels and the continued use of motorized boats on the river could cause erosion damage to stream bank

sites. Speed restrictions and stream bank stabilization, including planting native trees and riprapping, would help to mitigate this impact.

Effects on Recreation

Assumptions

The Wood River property was in private ownership, and therefore closed to the general public, until July 1993. It is assumed that use levels have increased over those of the past, but how much of an increase is unknown. Planned and expected use levels would increase the most under Alternative C because of the number of roads that would be improved and open to motorized vehicles, and the level of facilities that would be provided. Planned and expected use levels would increase the least under Alternative A because the area would remain closed to motorized vehicles and few, if any, facilities would be provided.

Alternative A

Adoption of this alternative would probably lead to the least number of visitors or recreationists using the area, as compared to the other alternatives. However, because the area was under private ownership and was only available for use by a few members of the public (through hunting clubs) until 1993, and because the area would be open to public use but closed to motorized vehicles, the numbers of recreationist visiting the area would be expected to increase slightly under this alternative.

Restricting the area to non-motorized recreation opportunities would benefit those recreationists seeking more primitive (less structured) recreation or greater solitude and would help meet the projected regional demand for non-motorized recreation. Those recreationists seeking recreation developments or motorized recreation opportunities would not benefit under this alternative as the area would remain closed to motorized vehicles.

Currently, easements are held by Tulana Farm employees and hunt club members, which allows them motorized vehicle access across the Wood River property along the south dike road. This access effectively gives them motorized access that is not afforded other members of the public, which is causing conflicts between the two groups of users. Although the property is closed to motorized vehicles, enforcement of this closure has been difficult because of a lack of BLM and non-BLM law enforce-

ment presence, and because with so many people possessing legal access, it is difficult to keep the gate locked at all times. This situation would be expected to continue under this alternative.

Alternatives B and D

Stream channel and wetland restoration activities, planting and seeding of native riparian and wetland vegetation, decreased levels of livestock grazing, and removal of certain facilities (such as the buildings, fences, and corrals) would improve scenic quality and sight-seeing/wildlife viewing opportunities in the long term. In the short term (during and shortly after earthwork associated with restoration activities), both scenic quality and sight-seeing/wildlife viewing opportunities would be decreased. Increased hunting, fishing, hiking, mountain biking, horseback riding, sight-seeing, and educational pursuits and opportunities also would be expected as a result of a greater amount of wetland habitat on the property.

Compared to Alternative A, greater recreation opportunities would be available, through the availability of limited motorized vehicle access, development of recreation facilities, and increased BLM management emphasis (such as identifying the area as a Watchable Wildlife site and designating the property as an area of critical environmental concern). This would help meet the regional recreation demand for non-motorized and motorized travel, and other recreation activities, including wildlife viewing, nature study, and visiting Interpretive Displays. The number of recreationists visiting the area would be expected to increase over levels under Alternative A.

Recreationists seeking a more structured recreation experience, through the availability of recreation facilities, interpretative opportunities, trails, etc., would benefit by implementation of either Alternative B or D. Recreationists seeking greater solitude or a non-motorized recreation experience would be slightly negatively affected under Alternative B. However, areas beyond gated roads and away from developed facilities, would still be available for non-motorized recreation opportunities. Recreationists seeking a motorized recreation experience, easier hunting or fishing access would not be benefited under Alternative D. Accommodations would be made for the disabled or mobility impaired. Other public land areas in the Klamath Basin offer ample motorized, hunting, and fishing access. Those recreationists seeking jet boat or air boat use areas

would not be benefited by implementation of either Alternative B or D as the area would continue to be closed to their use. Less noise and wildlife disturbance would result in positive effects on most other recreationists.

The availability of suitable land for developing parking areas on the south dike road and/or east (Wood River) dike road could severely restrict the ability to provide sufficient parking and day use areas, including a visitor facility. A suitable site, located on the east dike road, could be developed with minimal fill under Alternative B. The development of parking areas or day use areas on the south dike road would require filling in portions of potential wetland areas. See Map 5 for the recreation development scenario under Alternative B, and Map 7 for the likely recreation development scenario under Alternative D.

Development of improved roads and parking areas could negatively affect the quality of hunting, fishing, and wildlife viewing experiences due to greater disturbances from increased motorized access and recreation use. Under Alternative D, motorized vehicle use would be restricted to certain roads and times of the year to protect wildlife resources from disturbance, to provide a high quality recreation experience, and protect roads, dikes, and wetlands from degradation. This would not benefit motorized recreationists.

Alternative C

Stream channel and wetland restoration activities, planting and seeding of native riparian and wetland vegetation, decreased levels of livestock grazing, and removal of certain facilities (such as the buildings, fences, and corrals) would improve scenic quality and sight-seeing/wildlife viewing opportunities in the long term. In the short term (during and shortly after earthwork associated with restoration activities), both scenic quality and sight-seeing/wildlife viewing opportunities would be decreased. Due to the nature of wetland restoration options expected under Alternative C (see Chapter 3 for a description of the options), the increase in scenic quality would be less than that under Alternatives B or D. The largest increases in hiking, sight-seeing, horseback riding, mountain biking, and educational pursuits and opportunities would be expected under this alternative. Hunting and fishing access and opportunities could be more intensely managed causing restrictions, depending on locations and types of wetland restoration projects. This could negatively affect hunters and anglers.

Implementation of Alternative C would provide the greatest number of recreation opportunities, through more elaborate and/or more developed recreation facilities, the greatest level of motorized vehicle access, and the greatest level of BLM management emphasis (such as providing wetland restoration education interpretation, identifying the area as a Watchable Wildlife site, and designating the area as an area of critical environmental concern). The number of recreationists visiting the area would be expected to increase the most. This would help meet the demand for motorized travel and other recreation activities, such as wildlife viewing, nature study, and visiting interpretive displays. Meeting projected demand for non-motorized recreation opportunities would benefit the least under this alternative.

Recreationists seeking more structured recreation experiences through highly developed facilities would benefit the most by implementation of Alternative C because of the availability of interpretation, education, and social interaction. Recreationists seeking greater solitude or non-motorized recreation experiences would be the most negatively affected because little opportunity would be available for the non-motorized recreationists due to the level of road access on the property. Those recreationists seeking jet boat or air boat use areas would not benefit by implementation of this alternative. Less noise and wildlife disturbance would result in positive affect on most other recreationists. Quality of hunting, fishing, and wildlife viewing experiences would be less than that under Alternative B or D due to the potential for greater disturbances to wildlife from increased motorized access and recreation use in the long term, and short-term disturbance from stream and wetland restoration projects.

Four parking areas are proposed under Alternative C. Depending on the results of the topographic survey, the preliminary locations (see Map 6) may need to be changed or even eliminated if it is found that they could be inundated by water when the property's interior is flooded. In addition, since wetland restoration has priority over recreation facilities, the locations, sizes, and numbers of parking lots and other facilities could be modified depending on the location and type of restoration method.

Effects on Visual Resources

Assumptions

Surface-disturbing activities would disrupt the existing land surface and thereby cause effects on visual resources. In the long term, the Wood River property would be managed to meet Visual Resource Management (VRM) Class II or III objectives (except under Alternative A); however, currently the property and surrounding private pasture land are in a highly modified condition and are currently estimated to be in a VRM Class IV condition (major modification of the natural character of the landscape, management activities dominate the view and are the major focus of viewer attention). Many, if not most, of the proposed activities under Alternatives B, C, and D present opportunities to improve or provide positive effects to visual resources. These activities would help meet the long-term visual resources objective by moving toward a more natural condition for the visual landscape.

In the short term, it is expected that successful revegetation of proposed surface disturbing activities would occur rapidly with replanting and reseeded. Although greater contrasts between the disturbed surface or project and the existing landscape would be expected immediately after surface disturbance, visual resources are to be managed for the long-term objectives as stated above.

Alternative A

Adoption of this alternative would result in a continuation of the existing highly modified visual resource condition. Few opportunities would be available to improve the visual resources or create a more natural character for the visual landscape. One such opportunity includes prohibited grazing in riparian areas, which would result in a slightly positive effect on visual resources; however, long-term management of the visual resources would likely remain at the VRM Class IV level.

Alternatives B and D

In the long term, the opportunity to meet VRM Class II objectives would be greatest under these alternatives. The stream and wetland restoration activities (see the Water Resources sections in Chapter 3), vegetation management methods (such as planting native vegetation along river and creek banks, in pasture-lands, and along roads and dikes), and removal of some fences and other structures would provide the most positive effects to visual resources.

Some short-term (1 to 3 year) negative effects on visual resources would occur from surface-disturbing activities. However, positive effects would be expected in the long term as more natural vegetation succeeds. Recreation facilities would be designed to be rustic, natural appearing, and blend in with the natural landscape, and therefore would have only a minimal effect on visual resources.

Alternative C

Under this alternative, opportunities to meet VRM Class III objectives could occur in the long term. Proposed wetland restoration activities would cause positive effects on visual resources when compared to the No Action Alternative (Alternative A). Examples of these activities could include constructed wetlands with artificial water circulation and small pilot study areas. Vegetation management (such as revegetation of stream banks, dikes, roads, and pasture lands) and removal of some fences and other structures would also positively affect visual resources. Some short-term (1 to 3 year) negative effects on visual resources could occur from surface-disturbing activities. Through careful placement of artificial or experimental wetland areas and vegetative screening, long-term positive effects on visual resources would be expected. Although larger and more elaborate recreation facilities could occur under this alternative, these facilities would be designed to be rustic and natural appearing, and blend in with the natural landscape; therefore would have only a minimal effect on visual resources.

Effects on Soil Resources

Assumptions

Based on the principles outlined in Appendix C, the analysis of effects on soil resources is dependent upon the wetland functions that would be created or enhanced under each alternative.

Alternative A

Soils on the main property would continue to subside (the extent of this subsidence is not known) and would continue to leach organics and nutrients (due to the oxidation of the peats) into the Agency Lake and Wood River systems, which could cause reduced soil productivity in the long term. Soils would remain slightly compacted from continued livestock grazing; however, this effect is considered minor.

Alternatives B, C, and D

Soil disturbance would occur from stream channel and wetland restoration activities, road and dike/levee improvements and maintenance, and construction and use of recreation facilities. Heavy machinery would cause compaction and displacement of soil during construction. The level of disturbance, compaction, and displacement would depend on the amount of construction required by each management alternative and these effects would be offset somewhat by rewetting the soils, maintaining them in a saturated condition for extended periods of time, and periodically aerating them.

Alternative C would have the greatest short term and long term effects on soils; this is due to Alternative C having the most initial construction and long term maintenance requirements. Implementing Alternative D would have less short term and long term effects on soils than Alternative C, but more than B. This is due to Alternative D having fewer wetland cells and less stream channel dredging than Alternative C. Alternative B could have similar short term effects from construction as Alternative D, but would require less long term maintenance. Therefore, Alternative B would have the least effect from long term soil disturbance.

Effects on Air Quality

Assumptions

The major sources of air pollutants associated with BLM resource management on the Wood River property would be smoke from prescribed fire (levels of which have not yet been determined), and fugitive dust associated with road use, construction and maintenance activities, and other surface-disturbing activities. Fugitive dust from road use or earth-moving activities normally settles within a short distance from the point of origin. Preventive measures, such as maintaining moisture in the excavated material and quickly vegetating exposed soils, reduce fugitive dust. Negative effects on air quality from both pollution sources would be limited to the duration of the activity or shortly thereafter.

Alternative A

The least effects from dust and smoke would result, except during unauthorized, unplanned ignitions (wildfire), because neither prescribed burning nor major surface-disturbing activities would be initiated under this alternative.

Alternatives B, C, and D

The effects of prescribed burning on air quality depend on the type and amount of material consumed, ignition technique, and fire residence time (duration the fire burns). Peat fires typical in muck soils have burning characteristics similar to charcoal fires, (that is extremely hot fire producing little smoke for the volume of material burning). Surface fires in grass or wetlands produce more smoke due to the inefficiencies of the burning process. Peat fires tend to have long residence time and consume a great deal of fuel. Grass or tule fires burn quickly and have low volumes of fuel. The principal purpose for burning on the Wood River property would be to manage vegetation, which would be the quickly spreading fires of short duration in light fuels. Because burning would be conducted during unstable atmospheric conditions and with favorable transport winds, the effects from smoke would be limited to certain times of the year during favorable weather conditions. This means all three alternatives would have the same level of effects--which would be more than for Alternative A.

Effects on Socioeconomic Conditions

Under Alternative B, C, and D, 1 to 2 additional full-time employees would be needed to manage the property. Annual salaries for the new employees estimated to be approximately \$35,000 each. Additional employment could result from studies and projects performed by other agencies, universities, or groups.

The proposed monitoring plan identifies \$37,000 as an estimated annual expenditure for monitoring activities. Not all of these costs are paid by the BLM. Other Federal agencies, such as the Fish and Wildlife Service and the Bureau of Reclamation pay for portions of the monitoring plan as do the Klamath Tribes and private individuals.

Labor for stream and wetland restoration projects, estimated at \$750,000 over 10 years, described in Chapter 3 would most likely be done by contract. Wages paid would be the prevailing rate for heavy equipment and other skilled tasks. This increase in the local employment would be temporary, would last only until the stream and wetland restoration were completed, and is not anticipated to have any long term effect on the local economy.

Under Federal ownership, the Wood River property would be subject to a Annual Payment in Lieu of Taxes (PLT) of approximately \$322, which would be paid to Klamath County.

Livestock Alternative A

Under this alternative, a maximum of 3,600 AUMs (a maximum of 650 cow-calf pairs) approximately 650 cow-calf pairs would be allowed to graze the property between May 1 and November 30 each year. This grazing level would produce approximately \$188,000 in gross agricultural sales. Because the cattle are only on the property for half the year only half of these gross sales are attributable to the property, approximately \$94,000. This level of gross sales would support 1.5 jobs and \$19,250 of personal income.

Alternatives B

Under this alternative no livestock grazing would be allowed on the property. Consequently, there would not be any economic contribution made to the local economy from livestock grazing on the property.

Alternative C

Under Alternative C grazing use is estimated to not exceed 750 animal unit months of use in any given year that grazing is allowed. This level of use is anticipated to produce a maximum of \$4,000 personal income, in those years where grazing is allowed.

Alternative D

Under Alternative D grazing use is estimated to not exceed 1,500 animal unit months in any given year that grazing is allowed. This level of use is anticipated to produce a maximum of \$8,000 of personal income, in those years where grazing is allowed.

Recreation Uses Alternative A

Recreational use of the Wood River property would be the lowest under this alternative. Few facilities would be constructed. The major use would be waterfowl hunting in the fall although some economic benefits could accrue from hikers, bird watchers, and other non-consumptive users of public lands. Increased economic contributions to the local economy would primarily depend upon the number of people who came from out of town to use the property.

Alternatives B and D

Recreational opportunities would be greater under these alternatives than Alternative A. This is due to the construction of additional recreational facilities, interpretative facilities, promotion of the facility, etc. Over the long term additional recreationists are expected to visit the property from out of town, thereby increasing the economic contribution to the local economy. The amount of the increase is unknown.

Alternative C

Recreational opportunities would be greatest under this alternative. Development of more elaborate and/or more developed recreational facilities, the greatest level of motorized vehicle access and management activities, such as wetland restoration, education and interpretation, watchable wildlife site, etc. is expected to attract more visitors than the other alternatives. More visitors would increase the likelihood of out of town visitors which would increase the economic contribution to the local economy. The amount of increase is unknown.

Chapter 5

Consultation and Coordination

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Introduction

The Proposed Upper Klamath Basin and Wood River Resource Management Plan/Final Environmental Impact Statement (PRMP/FEIS) was prepared by an interdisciplinary team of specialists from the Klamath Falls Resource Area, with assistance from other federal agencies, state agencies, local groups, and other individuals listed below. Although the actual writing of this PRMP/FEIS began in mid 1993, an elaborate public input process, that began in late 1992, preceded the writing phases. The planning process involved many steps (described in Chapter 1), with public participation, as well as consultation and coordination with many agencies and organizations throughout the process. The public involvement process is summarized in Chapter 1 in the Public Involvement and Wood River Wetland Team sections. See also Appendix A for comments/responses and reproduced letters.

This chapter includes the agencies, organizations, and individuals who were contacted throughout the plan development, as well as those that were sent a copy of this PRMP/FEIS. Finally, the preparers of the document are listed with their qualifications.

Protest Process

The resource management planning process includes an opportunity for administrative review via a plan protest to the BLM Director if you believe the approval of a proposed resource management plan would be in error under 43 CFR 1610.5-2. Careful adherence to these guidelines will assist in preparing a protest that will assure the greatest consideration to your point of new.

Only those persons or organizations who participated in our planning process leading to this proposed resource management plan may protest. If our records do not indicate that you had any involvement in any stage in the preparation of the Klamath Falls Resource Area proposed Upper Klamath Basin and Wood River Wetland Resource Management Plan, your protest will be dismissed without further review.

A protesting party may raise only those issues which he or she submitted for the record during the planning process. New issues identified during the protest period should be directed to the District Manager for consideration during plan implementation, as potential plan amendments, or as otherwise

appropriate. If an issue is shared by several individuals or landowners or interest groups, a combined protest on the common neighborhood issue or concern may be mutually more efficient and effective. For example, several landowners may wish to combine their concerns on a proposed management issue, such as water rights, that affects their common interests.

The period for filing a plan protest begins when the Environmental Protection Agency publishes in the Federal Register its Notice of Availability of the final environmental impact statement concerning the proposed resource management plan or amendment. The protest and comment period will end 30 days after the Environmental Protection Agency publishes its Notice of Availability in the Federal Register. There is no provision in BLM's regulations for any extension of time, and no extensions for filing protests will be granted. To be considered "timely", your protest must be postmarked no later than the last day of the protest period. Also, although not a requirement, we suggest that you send your protest by certified mail, return receipt requested.

Protests must be filed in writing to:

Director
Bureau of Land Management,
U.S. Department of the Interior,
Resource Planning (480),
P.O. Box 65775,
Washington, D.C. 20235

To be considered complete, your protest must contain, at a minimum, the following information:

1. The name, mailing address, telephone number, and interest of the person filing the protest.
2. A statement of the issue or issues being protested.
3. A statement of the part or parts of the specific (named) proposed resource management plan being protested. To the extent possible, this should be done by reference to specific pages, paragraphs, sections, tables, maps, etc. included in the document.
4. A copy of all documents addressing the issue or issues that you submitted during the planning process or a reference to the date the issues were discussed by you for the record.
5. A concise statement explaining why the BLM State Director's decision is believed to be incorrect. This is a critical part of your protest.

Document all relevant facts. As much as possible, reference or cite the planning documents, environmental analysis documents, and available planning records (for example, meeting minutes or summaries, or correspondence). A protest which merely expresses disagreement with the Oregon/Washington State Director's proposed decision, without any data, will not provide us with the benefit of your information and insight. In this case, the Director's review will be based on the existing analysis and supporting data.

Summary of Comments

Appendix A contains a summary of comments received on the draft plan along with BLM responses. The substantive comments are paraphrased in some cases as allowed for by the National Environmental Policy Act (40 Code of Federal Regulations 1503.4). The appendix also contains reproduced copies of all the comment letters.

Agencies, Organizations, and Individuals Contacted and/or Sent Copies of the Proposed Plan

The following agencies, organizations, and individuals represents the list of people who received copies of this proposed plan and final environmental impact statement. Active participants in the Wood River Wetland Team process are indicated by bold text.

Federal Agencies

Department of Agriculture
U.S. Forest Service
Natural Resource Conservation Service
Department of Defense
U.S. Air Force
U.S. Army Corps of Engineers
Department of Energy
Bonneville Power Administration
Department of the Interior
Bureau of Indian Affairs
Bureau of Land Management
Bureau of Mines
Bureau of Reclamation
Minerals Management Service
Natural Resources Library
National Park Service
Office of Environmental Project Review
Office of Public Affairs
U.S. Fish & Wildlife Service
U.S. Geological Survey
Ecosystem Restoration Office
Lava Beds National Monument
National Marine Fisheries Service
National Oceanic & Atmospheric Administration
Regional Ecosystem Office
U.S. Environmental Protection Agency

Federal and State Elected Representatives

California State Representative Stan Statham
Governor John Kitzhaber
Honorable Wes Cooley
Honorable Mark O. Hatfield
Honorable Robert Packwood
Oregon Representative D.E. Jones
Oregon Representative Dennis Luke
Oregon Representative Del Parks
Oregon Senator Eugene Timms
Oregon Senator Neil Bryant

Native American Organizations

Hoopla Valley Tribe
Karuk Tribe of California
Klamath Tribes

Oregon State Agencies

Department of Agriculture
Department of Economic Development
Department of Energy
Department of Environmental Quality
Department of Fish & Wildlife
Department of Forestry
Department of Geology and Mineral Industries

Chapter 5 - Consultation and Coordination

Department of Land Conservation and Development
Department of Parks and Recreation
Department of Transportation
Department of Water Resources
Division of State Lands
Governors Forest Planning Team
Historical Preservation Office
Legal Services
Marine Board
Northwest Power Planning Council
Office of the Governor
Public Utilities Commission
State Library

California State Agencies

Department of Fish and Game

Local Government

City of Klamath Falls
Klamath County
Libraries
Chamber of Commerce
Commissioners
Economic Development
Extension Service
Historical Society
Parks Department
Planning Department
School District
Soil & Water Conservation
Shasta County Library
Modoc County Board of Supervisors

Universities

Humbolt State University
Oregon Institute of Technology
Oregon State University - Extension Office
Oregon State University Library
University of Oregon Library

Organizations

American Land Conservancy
American Rivers, Inc.
Audubon Society of the Klamath Basin
Beak Consultants
California Clearinghouse
Concerned Friends of the Winema
Ducks Unlimited
Eco Northwest
Environmental Management Associates
Friends of the River
Herald & News
KAGO AM & FM 99
KBOY AM/FM
KDKF-TV
KDRV-TV

KFLS/KKRB
KLAD Radio
KOTI-TV
KTVL-10 Medford
Klamath Basin Water Resources Advisory Committee
Klamath Basin Water Users Protective Association
Klamath Basin Waterfowl Association
Klamath Cattlemen's Association
Klamath Potato Growers Association
Klamath River Compact
Klamath River Fisheries Restoration Office
Meadows Drainage District
McGuire Consulting
National Wildlife Federation
Native Plant Society
Natural Resources Defense Council
Oregon Hunters Association
Oregon Institute of Technology
Oregon Natural Desert Association
Oregon Natural Resources Council
Oregon Trout
Oregon Waterfowl & Wetlands Association
Oregon Watershed Improvement Coalition
Oregon Wetlands Joint Venture
Oregonian
Pacific Forest & Basin Rangelands System
Pacific Power and Light
Pacific Rivers Council
PIC Tech, Inc.
The Nature Conservancy
Resource Management International
Sierra Club
Sierra Club Legal Defense Fund
Siskiyou Daily News
Tulana Farms
Tulelake Irrigation District
Water for Life
Western Aquatic Turtle Research Consortium
Wetlands Conservancy
Weyerhaeuser Company
Wilderness Society

Individuals/Landowners

Mike Allen
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Thomas A. Barns
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Mike Byrne
Jim Carpenter
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Rick Liepitz
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Klamath Basin Water Users Protective Association

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The Klamath Tribes

The Klamath Tribes, Gordon Bettles

Marian L. Leman

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C. McElroy

David F. Olson

Oregon Department of Fish and Wildlife

Oregon Department of Fish and Wildlife, Glen Ardt

Oregon Natural Resources Council, Wendell Wood

Oregon Waterfowl and Wetlands Association, Paul White

George and Rhonda Ostertag

Mary Paetzel

Elanor A. Pugh

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Running Y, Inc.

Marcia Santee

Martha Sells

Sierra Club - Klamath Group

Carroll Thomas

Trout Unlimited

Trout Unlimited, Doug Pratt

U.S. Environmental Protection Agency

U.S. Environmental Protection Agency Region 10

Jean Ward

Richard Zwiener

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Name	Position/Responsibilities	Qualification
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Chapter 6

Bibliography and Glossary

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Glossary

Absorption - The taking in or incorporation of molecules of gases, solutes, or liquids into the solid bodies or liquids with which they are in contact.

Acre Foot - The volume of water that would cover one acre to a depth of one foot (325,851 gallons).

Adsorption - The adhesion in an extremely thin layer of molecules of gases, solutes, or liquids to the surfaces of solid bodies or liquids with which they are in contact.

Aerobic - Having molecular oxygen as part of the environment; growing or occurring only in the presence of molecular oxygen.

Airshed - The geographic area covered by an air supply.

Alluvial - Relating to, composed of, or found in the clay, silt, sand, gravel, or similar detrital material deposited by running water.

Anaerobic - The absence of or growing in the absence of molecular oxygen.

Animal Unit Month - The amount of forage necessary for maintaining one cow or its equivalent for one month.

Aquatic Bed - Wetlands and deepwater habitats dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Water regimes include subtidal, irregularly exposed, regularly flooded, permanently flooded, intermittently exposed, semipermanently flooded, and seasonally flooded. Aquatic Beds represent a diverse group of plant communities that requires surface water for optimum growth and reproduction. They are best developed in relatively permanent water or under conditions of repeated flooding. The plants are either attached to the substrate or float freely in the water above the bottom or on the surface.

Area of Critical Environmental Concern (ACEC) - An area of BLM-administered lands where special management attention is needed to protect and prevent irreparable damage to important historic, cultural or scenic values, fish and wildlife resources or other natural systems or processes; or to protect

life and provide safety from natural hazards. (Also see Potential ACEC.)

Beneficial Use - The reasonable use of water for a purpose consistent with the laws and best interest of the peoples of the state. Such uses include, but are not limited to, the following: instream, out of stream and groundwater uses, domestic, municipal, industrial water supply, mining, irrigation, livestock watering, fish and aquatic life, wildlife, fishing, water contact recreation, aesthetics and scenic attraction, hydropower, and commercial navigation.

Best Management Practices (BMP) - Methods, measures, or practices designed to prevent or reduce water pollution. Not limited to structural and non-structural controls, and procedures for operations and maintenance. Usually, BMPs are applied as a system of practices rather than one single practice.

Biomass - The total mass of organic material of a species per unit of area or volume.

Biota - The animal and plant life of a region.

Breccia - Fragmental rock whose pieces are angular unlike water worn material. There are fault breccias, talus breccias, and eruptive volcanic breccias.

Bureau Assessment Species - Plant and animal species on List 2 of the Oregon Natural Heritage Data-base, or those species on the Oregon List of Sensitive Wildlife Species (OAR 635-100-040), that are identified in BLM Instruction Memo No. OR-91-57, and are not included as federal candidate, state listed or Bureau sensitive species.

Bureau Sensitive Species - Plant or animal species eligible for federal listed, federal candidate, state listed, or state candidate (plant) status, or on List 1 in the Oregon Natural Heritage Database, or approved for this category by the State Director.

Candidate Species - Those plants and animals included in Federal Register "Notices of Review" that are being considered by the U.S. Fish and Wildlife Service (USFWS) for listing as threatened or endangered. There are two categories that are of primary concern to the BLM. These are:

Category 1. Taxa for which the USFWS has substantial information on hand to support proposing the species for listing as threatened or endangered. Listing proposals are either being prepared or have been delayed by higher priority listing work.

Category 2. Taxa for which the USFWS has information to indicate that listing is possibly appropriate. Additional information is being collected.

Channel Roughness - A measure of the roughness of the surface of a channel that indicates how much resistance (friction) will be exerted on flowing water (which in turn slows the velocity of the flowing water).

Channelization - To straighten by means of a channel.

Characteristic Landscape - The established landscape within an area being viewed. This does not necessarily mean a naturalistic character. It could refer to an agricultural setting, an urban landscape, a primarily natural environment, or a combination of these types.

Clastic Rock - A consolidated sedimentary rock composed of fragments broken or eroded from pre-existing rocks of any origin by chemical or mechanical weathering. Examples are conglomerate, sandstone, and siltstone.

Concern - A topic of management or public interest that is not well enough defined to become a planning issue, or does not involve controversy or dispute over resource management activities or land use allocations or lend itself to designating land use alternatives. A concern may be addressed in analysis, background documents, or procedures, or in a noncontroversial decision.

Consistency - Under the Federal Land Policy and Management Act, the adherence of BLM resource management plans to the terms, conditions, and decisions of officially approved and adopted resource related plans, or in their absence, with policies and programs of other federal agencies, state and local governments, and Indian tribes, so long as the plans are also consistent with the purposes, policies, and programs of federal laws and regulations applicable to BLM-administered lands. Under the Coastal Zone Management Act, the adherence to approved state management programs to the maximum extent practicable, of federal agency activities affecting the defined coastal zone.

Cubic feet per second - See cubic foot

Cubic Foot - Having a volume equal to a cube of one foot by one foot by one foot dimension.

Cultural Resource - Any definite location of past human activity identifiable through field survey, historical documentation, or oral evidence; includes archaeological or architectural sites, structures, or places, and places of traditional cultural or religious importance to specified groups whether or not represented by physical remains.

Cultural Site - Any location that includes prehistoric and/or historic evidence of human use or that has important sociocultural value.

Cumulative Effect - The impact that results from identified actions when they are added to other past, present, and reasonably foreseeable future actions regardless of who undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

Denitrification - The process of freeing nitrogen from its compounds or of reducing nitrates to simpler compounds (nitrites, oxides of nitrogen, ammonia) and eventually free nitrogen (N₂). It occurs especially in waterlogged soils under anaerobic conditions through the action of denitrifying bacteria.

Diked - Created or modified by a man-made barrier or dike designed to obstruct the inflow of water.

Domestic Water Supply - Water used for human consumption.

Easement - A right in the owner of one parcel of land, by reason of such ownership, to use the land of another for a special purpose not inconsistent with a general property in the owner.

Eligible River - A river or river segment found, through interdisciplinary team and, in some cases, interagency review, to meet Wild and Scenic River Act criteria of being free-flowing and possessing one or more outstandingly remarkable values.

Emergent Wetland - Emergent Wetland is characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. All water regimes are included except subtidal and irregularly exposed. In areas

with relatively stable climatic conditions, Emergent Wetlands maintain the same appearance year after year.

Endangered Species - Any species defined through the Endangered Species Act as being in danger of extinction throughout all or a significant portion of its range and published in the Federal Register.

Environmental Assessment (EA) - A systematic analysis of site-specific BLM activities used to determine whether such activities have a significant effect on the quality of the human environment and whether a formal environmental impact statement is required; and to aid an agency's compliance with the National Environmental Policy Act when no EIS is necessary.

Environmental Impact - The positive or negative effect of any action upon a given area or resource.

Environmental Impact Statement (EIS) - A formal document to be filed with the Environmental Protection Agency that considers significant environmental impacts expected from implementation of a major federal action.

Ethnographic Present - An anthropological term meaning the present day culture of an indigenous group, such as a tribe organization of Native Americans.

Eutrophic - A body of water rich in nutrients, either naturally or through pollution. These bodies of water are often shallow, with seasonal deficiencies in dissolved oxygen. Algal blooms often occur seasonally.

Fault - A break in the earth's crust along which movement has taken place.

Federal Candidate - See Candidate Species

Federally Listed - See Endangered Species or Threatened Species.

Federally Proposed - See Proposed Species.

Ferric - Of, relating to, or containing iron.

Historic Site - A cultural resource resulting from activities or events dating to the historic period (generally post 1830 A.D. in western Oregon).

Hydrology - The properties distribution and circulation of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere.

Hypereutropic - A eutropic body of water where extreme fluctuations in pH, dissolved oxygen, and ammonia occur. In addition, the algal blooms that occur are dominated by a single specie and are massive.

Interstitial Water - Water located in the spaces between sediment particles.

Impact - A spatial or temporal change in the environment caused by human activity.

Impounded - Created or modified by a barrier or dam which purposefully or unintentionally obstructs the outflow of water. Both man-made dams and beaver dams are included.

Impounded Wetland - A wetland where water is artificially controlled.

Infiltration (soil) - The movement of water through the soil surface into the soil.

Intermittently Exposed - Surface water is present throughout the year except in years of extreme drought.

Intermittently Flooded - The substrate is usually exposed, but surface water is present for variable periods without detectable seasonal periodicity. Weeks, months, or even years may intervene between periods of inundation. The dominant plant communities under this regime may change as soil moisture conditions change. Some areas exhibiting this regime do not fall within our definition of wetland because they do not have hydric soils or support hydrophytes.

Irreversible or Irretrievable Commitment of Resources - Effect of an action or inaction that cannot be reversed within a reasonable time.

Issue - A matter of controversy or dispute over resource management activities that is well defined or topically discrete. Addressed in the design of planning alternatives.

Lacustrine System - Of, relating to, formed in, or growing in lakes. According to the U.S. Fish and Wildlife Service, a Lacustrine System includes wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergents, emergent mosses, or lichens with greater than 30 percent areal coverage; and (3) total area exceeds 8 ha (20 acres). Similar wetland and deep-water habitats

Glossary

totaling less than 8 ha are also included in the Lacustrine System if an active wave-formed or bedrock shoreline feature makes up all or part of the boundary, or if the water depth in the deepest part of the basin exceeds 2 meters (6.6 feet) at low water. Lacustrine waters may be tidal or nontidal, but ocean-derived salinity is always less than 0.5 mg/l. The Lacustrine System is bounded by upland or by wetland dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens. Lacustrine Systems formed by damming a river channel are bounded by a contour approximately the normal spillway elevation or normal pool elevation, except where Palustrine wetlands extend lakeward of that boundary. Where a river enters a lake, the extension of the Lacustrine shoreline forms the Riverine-Lacustrine boundary.

Lake Stratification - A thermal layering in the warm season occurs when water at various depths will not mix with other water due to differences in water density (weight) associated with temperature differences.

Landscape Features - The land and water form, vegetation, and structures that compose the characteristic landscape.

Lava - Molten rock that is extruded upon the earth's surface. Even after cooling it may be referred to as lava flows.

Leasable Minerals - Minerals that may be leased to private interests by the federal government. Includes oil, gas, geothermal resources, and coal.

Litterfall - The period of time, when a plant sheds vegetative material, prior to dormancy.

Littoral - All lacustrine wetland habitats that extend from the shore to a depth of 2 meters (6.6 feet) below low water.

Locatable Minerals - Minerals subject to exploration, development, and disposal by staking mining claims as authorized by the Mining Law of 1872 (as amend-ed). This includes valuable deposits of gold, silver, and other uncommon minerals not subject to lease or sale.

Macronutrient - A chemical element of which relatively large quantities are essential to the growth and welfare of a plant.

Management Activity - An activity undertaken for the purpose of harvesting, traversing, transporting, protecting, changing, replenishing, or otherwise using resources.

Management Framework Plan (MFP) - A land use plan that established coordinated land use allocations for all resource and support activities for a specific land area within a BLM district. It established objectives and constraints for each resource and support activity and provided data for consideration in program planning. This process has been replaced by the Resource Management Planning process.

Micronutrient - A chemical element of which relatively small or minute quantities are essential to the growth and welfare of a plant.

Mineral Estate - The ownership of the minerals at or beneath the surface of the land.

Mitigating Measures - Modifications of actions that (a) avoid effects by not taking a certain action or parts of an action; (b) minimize effects by limiting the degree or magnitude of the action and its implementation; (c) rectify effects by repairing, rehabilitating, or restoring the affected environment; (d) reduce or eliminate effects over time by preservation and maintenance operations during the life of the action; or (e) compensate for effects by replacing or providing substitute resources or environments.

Monitoring/Evaluation - The orderly collection and analysis of data to evaluate the progress and effectiveness of on-the-ground actions in meeting resource management objectives.

Multiple Use - Management of the public lands and their various resource values so that they are used in the combination that will best meet the present and future needs of the American people; making the most judicious use of the land for some or all of these resources or related services over areas large enough to provide sufficient latitude for periodic adjustments in use to conform to changing needs and conditions; the use of some land for less than all of the resources; a combination of balanced and diverse resource uses that takes into account the long-term needs of future generations for renewable and nonrenewable resources, including, but not limited to, recreation, range, timber, minerals, watershed, wildlife and fish, and natural scenic, scientific, and historical values; and harmonious and coordinated management of the various resources without permanent impairment of the productivity of the land and the quality of the environment with

consideration being given to the relative values of the resources and not necessarily to the combination of uses that will give the greatest economic return or the greatest unit output.

Neotropical Migratory Birds - New world birds that migrate north each spring to breeding grounds in the United States and Canada, then fly south to winter in Mexico, Central America, or the Caribbean.

Nonpoint Source Pollution - Water pollution that does not result from a discharge at a specific, single location (such as a single pipe) but generally results from land runoff, precipitation, atmospheric deposition or percolation, and normally is associated with agricultural, silvicultural and urban runoff, runoff from construction activities, etc. Such pollution results in the human-made or human-induced alteration of the chemical, physical, biological, radiological integrity of water.

Noxious Plant - A plant specified by law as being especially undesirable, troublesome, and difficult to control.

Noxious Weed - See Noxious Plant.

Nutrient Cycling - Circulation or exchange of elements such as nitrogen and carbon between nonliving and living portions of the environment. Includes all mineral and nutrient cycles involving mammals and vegetation.

Nutrient Depletion - Detrimental changes on a site in the total amount of nutrients and/or their rates of input, uptake, release, movement, transformation, or export.

Outstandingly Remarkable Values (ORVs) - Values among those listed in Section 1 (b) of the Wild and

Scenic Rivers Act: "scenic, recreational, geological, fish and wildlife, historical, cultural, or other similar values ..." Other similar values that may be considered include ecological, biological or botanical, paleontological, hydrological, scientific or research.

Overland Flow - Water flowing over the ground surface, rather than percolating into it.

Pair Of Cattle - One cow and calf.

Palustrine System - Growing in or inhabiting marshes. According to the U.S. Fish and Wildlife Service a Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and all

such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5 mg/l. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 8 ha (20 acres); (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 2 meters at low water; and (4) salinity due to ocean-derived salts less than 0.5 mg/l. The Palustrine System is bounded by upland or by any of the other four Systems. The Palustrine System was developed to group the vegetated wetlands traditionally called by such names as marsh, swamp, bog, fen, and prairie, which are found throughout the United States. It also includes the small, shallow, permanent or intermittent water bodies often called ponds. Palustrine wetlands may be situated shoreward of lakes, river channels, or estuaries; on river floodplains; in isolated catchments; or on slopes. They may also occur as islands in lakes or rivers. The erosive forces of wind and water are of minor importance except during severe floods.

Partly Drained - The water level has been artificially lowered, but the area is still classified as wetland because soil moisture is sufficient to support hydrophytes. Drained areas are not considered wetland if they can no longer support hydrophytes.

Peak Flow - The highest amount of stream or river flow occurring in a year or from a single storm event.

Perennial Stream - Stream that has running water on a year round basis.

Permanently Flooded - Water cover the land surface throughout the year in all years. Vegetation is composed of obligate hydrophytes.

Plan Amendment - A change in the terms, conditions, or decisions of a resource management plan.

Plan Maintenance - Any documented minor change that interprets, clarifies, or refines a decision within a resource management plan but does not change the scope or conditions of that decision.

Plan Revision - A new resource management plan prepared by following all steps required by the regulations for preparing an original resource management plan.

Phenological - Of or relating to periodic biological phenomena, as breeding, flowering, and migration, especially as related to climate.

Potential ACEC - An area of BLM-administered land that meets the relevance and importance criteria for ACEC designation, as follows:

(1) Relevance. There shall be present a significant historic, cultural, or scenic value; a fish or wildlife resource or other natural system or process; or natural hazard.

(2) Importance. The above described value, resource, system, process, or hazard shall have substantial significance and values. This generally requires qualities of more than local significance and special worth, consequence, meaning, distinctiveness, or cause for concern. A natural hazard can be important if it is a significant threat to human life or property.

Preferred Alternative - That plan alternative, in the draft environmental assessment or draft environmental impact statement, which management has initially selected as offering the most acceptable resolution of the planning issues and management concerns.

Prescribed Fire - Introduction of fire under regulated conditions for management purposes.

Prime Farmlands - Land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land, but not urban built-up land or water). It has the soil quality, growing season, and moisture supply needed to economically produce sustained high yields of crops when treated and managed, including water management, according to acceptable farming methods. In general, prime farmlands have an adequate and dependable water supply from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, acceptable salt and sodium content, and few or no rocks. They are permeable to water and air. Prime farmlands are not excessively erodible or saturated with water for a long period of time, and they either do not flood frequently or are protected from flooding. Examples of soils that qualify as prime farmland are Palouse silt loam, 0 to 7 percent slopes; Brookston silty clay loam, drained; and Tama silty clay loam, 0 to 5 percent slopes.

Proper Functioning Condition - Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris is present to dissipate stream energy associated with high waterflows, thereby reducing erosion and improving water quality; filter sediment, capture

bedload, and aid floodplain development; improve flood-water retention and ground-water recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration, and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. The functioning condition of riparian-wetland areas is a result of interaction among geology, soil, water, and vegetation.

Proposed Action - Any resource use or development or management action proposed by the Bureau or to the Bureau by a member of the public or by another agency through any appropriately developed procedures including, in the case of non-Bureau proposals, nominations, petitions, and applications.

Proposed Plan - That plan alternative (or modification or combination of alternatives), in the final EA or final EIS, which management has selected as the Bureau's choice for selection as the plan. The State Director announces and explains the choice of the proposed plan in a signed statement near the front of the plan and environmental document. This indication does not constitute approval. (See Record of Decision.)

Proposed Threatened or Endangered Species - Plant or animal species proposed by the U.S. Fish & Wildlife Service to be biologically appropriate for listing as threatened or endangered, and published in the Federal Register. It is not a final designation.

Prospect - To examine land for the possible occurrence of coal or valuable minerals by drilling holes, ditching, or other work.

Refugium - Places in a waterbody that provide food, resting places, and shelter for young fish.

Reservoir Rock - Any rock that contains liquid or gaseous hydrocarbons by virtue of its porosity or joint and fracture systems. Sandstones and limestones are the most commonly encountered reservoir rocks.

Resource Management Plan (RMP) - A land use plan prepared by the BLM under current regulations in accordance with the Federal Land Policy and Management Act.

Right-of-Way - A permit or an easement (document) that authorizes the use of public lands for specified purposes, such as pipelines, roads, telephone lines, electric lines, and reservoirs.

Riparian Zone/Area - Those terrestrial areas where the vegetation complex and microclimate conditions are products of the combined presence and influence of perennial and/or intermittent water, associated high water tables and soils that exhibit some wetness characteristics. Normally used to refer to the zone within which plants grow rooted in the water table of these rivers, streams, lakes, ponds, reservoirs, springs, marshes, seeps, bogs, and wet meadows.

Scenic Quality - The relative worth of a landscape from a visual perception point of view.

Seasonally Flooded. Surface water is present for extended periods especially early in the growing season, but is absent by the end of the season in most years. When surface water is absent, the water table is often near the land surface.

Sediment Yield - The quantity of soil, rock particles, organic matter or other debris transported through a cross-section of stream in a given period of time. Measured in dry weight or by volume. Consists of suspended sediment and bedload.

Semipermanently Flooded - Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land surface.

Sheet Flow - Water flowing over the ground surface in a thin layer, with no defined channel. Sorbents - Substances that take up and hold other substances by adsorption or absorption.

Source Rock - The geological formation in which oil, gas, and/or other minerals originate.

Special Areas - Areas that may need special management, which may include management as an area of critical environmental concern, research natural area, outstanding natural area, environmental education area, or other special category.

Special Recreation Management Area (SRMA) - An area where a commitment has been to provide specific recreation activity and experience opportunities.

These areas usually require a high level of recreation investment and/or management. They include recreation sites but recreation sites alone do not constitute SRMAs.

Special Status Species - Plant or animal species falling in any of the following categories (see separate glossary definitions for each):

- * Threatened or Endangered Species
- * Proposed Threatened or Endangered Species
- * Candidate Species
- * State Listed Species
- * Bureau Sensitive Species
- * Bureau Assessment Species

Species Diversity - The number, different kinds and relative abundance of species.

State Implementation Plan (SIP) - A state document, required by the Clean Air Act. It describes a comprehensive plan of action for achieving specified air quality objectives and standards for a particular locality or region within a specified time.

State Listed Species - Plant or animal species listed by the State of Oregon as threatened or endangered pursuant to ORS 496.004, ORS 498.026, or ORS 564.040.

Stratification - A structure produced by deposition of sediments in beds or layers.

Subsidence - The result of several processes, including wind erosion, oxidation of peat, compaction, and drainage pumping, that causes the surface elevation of a given parcel of land to be lowered.

Suitable River - A river segment found, through administrative study by an appropriate agency, to meet the criteria for designation as a component of the National Wild and Scenic Rivers system, specified in Section 4(a) of the Wild and Scenic Rivers Act.

Surface Erosion - The detachment and transport of soil particles by wind, water, or gravity. Surface erosion can occur as the loss of soil in a uniform layer (sheet erosion), in many rills, or by dry ravel.

Suspended Sediment - Sediment suspended in a fluid by the upward components of turbulent currents or by colloidal suspension.

Temporarily Flooded - Surface water is present for brief periods during the growing season, but the water table usually lies well below the soil surface for most of the season. Plants that grow both in uplands and wetlands are characteristic of the temporarily flooded regime.

Threatened Species - Any species defined through the Endangered Species Act as likely to become endangered within the foreseeable future throughout all or a significant portion of its range and published in the Federal Register.

Glossary

Tuff - A rock formed of compacted volcanic ash whose particles are generally finer than 4 mm in diameter.

Unique Farmland - Land other than prime farmland that is used for the production of specific high value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality and/or high yields of a specific crop when treated and managed according to acceptable farming methods. Examples of such crops are citrus, tree nuts, olives, cranberries, fruit, and vegetables.

Viewshed - The landscape that can be directly seen from a viewpoint or along a transportation corridor.

Visual Resources - The visible physical features of a landscape.

Visual Resource Management (VRM) - The inventory and planning actions to identify visual values and establish objectives for managing those values and the management actions to achieve visual management objectives.

Visual Resource Management Classes - Categories assigned to public lands based on scenic quality, sensitivity level, and distance zones. There are four classes. Each class has an objective that prescribes the amount of modification allowed in the landscape.

Class I - The objective is to preserve the existing character of the landscape. The level of change to the characteristic landscape should be minimal and must not attract attention. This class provides for natural ecological changes; however, it does not preclude very limited management activity.

Class II - The objective is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements or form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III - The objective is to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV - The objective is to provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance and repeating the basic elements.

Water Quality - The chemical, physical, and biological characteristics of water.

Water Yield - The quantity of water derived from a unit area of watershed.

Wetlands or Wetland Habitat - Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include, but are not limited to, swamps, marshes, bogs, and similar areas.

Wet Meadows - Areas where grasses predominate. Normally waterlogged within a few inches of the ground surface.

Wild and Scenic River System - A national system of rivers or river segments that have been designated by Congress and the President as part of the National Wild and Scenic Rivers System (Public Law 90-542, 1968). Each designated river is classified as one of the following:

Wild River - A river or section of a river free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and waters unpolluted. Designated wild as part of the National Wild and Scenic Rivers System.

Scenic River - A river or section of a river free of impoundments, with shorelines or watersheds still largely primitive and undeveloped but accessible in places by roads. Designated scenic as part of the National Wild and Scenic Rivers System.

Recreational River - A river or section of a river readily accessible by road or railroad, that may have some development along its shorelines, and that may have undergone some impoundment or diversion in the past. Designated recreational as part of the National Wild and Scenic Rivers System.

Appendices

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Appendix A

Comment/Response and Reproduced Letters

Introduction

This appendix is the Klamath Falls Resource Area's analysis of comments that were received during the scoping and comment periods of the draft Resource Management Plan and Environmental Impact Statement. The first part of the appendix contains synthesized comments with the BLM response to those comments. Often more than one individual and/or group had the same comment. When this occurred, those comments were consolidated into one generalized comment and answered once. Comments on similar topics were grouped so that the reader can more easily find their area of interest. Because the Wood River Wetland process has entailed such extensive public involvement opportunities and many of the comments received during public meetings were given orally, the KFRA has also tried to include summaries of the major oral comments in this comment/response section. Many oral comments regarding editorial or other relatively minor points may not be reflected in this appendix, since many were incorporated into the document at the time the comment was made or the reasons for not incorporating them were discussed with the group.

The second part of this appendix contains reproduced copies of all the comment letters received during the March 1, 1994, to June 17, 1994, comment period. Copies of other letters received during development of the Environmental Impact Statement, both before and after the "official" comment period, are also included in this appendix since they have been considered as much as possible in the development of this proposed resource management plan/final environmental impact statement. Copies of all comment letters are available for public review in the Klamath Falls Resource Area office during normal working hours.

Miscellaneous

- 1** **COMMENT** Regarding the Draft Title, I feel it should refer to the Wood River Plan and not infer it is a plan for the entire Wood River Valley. The team started out with this specific site plan in mind....Additional BLM lands should not be developed or managed under this plan, until the results of Resource Management at Wood River Ranch have been scientifically analyzed.

RESPONSE *The title of the document has been changed to better reflect the emphasis on wetland restoration on the Wood River property.*
- 2** **COMMENT** I don't think bog fires were discussed in any detail. There has been fires started by vehicle exhaust. Prescribed burning on this property can be extremely difficult due to fire wanting to go downwards.

RESPONSE *Chapter 3 states that parameters for the proper use of prescribed fire would be developed under all management alternatives.*
- 3** **COMMENT** Kirk Chock soils are better suited to sprinkler irrigation of high value crops due to the cost of running a sprinkler system. A sprinkler system on a low value crop would jeopardize the feasibility of the crop.

RESPONSE *The statement about Kirk Chock soils is intended to show the effect of flood irrigation on this soil type and is not intended to address economics.*

4 COMMENT Cost of plan implementation or savings to the taxpayer should be addressed.

RESPONSE *Information gathered during the past two years indicates that the goals and objectives for the property cannot be met by the least expensive option. We developed a range of alternatives that would meet the goals and objectives set for the property. The proposed action is neither the least nor the most expensive option available, but we believe it is the alternative that will provide the most public benefits for the monies expended. We also anticipate implementation costs will be shared with a number of non-federal public and private partners thereby reducing the impact to the taxpayer.*

Scope of Document

5 COMMENT Where are you going to cut these 'unspecified' parcels of timber? How many acres will be cut? How thorough was your EA on these sites?... and the public should have the right to know and comment on these actions.

RESPONSE *The comment refers to a separate environmental assessment on disposal of public lands. The comment was addressed in that National Environmental Protection Act document which included public participation and comment opportunities. This Resource Management Plan/Environmental Impact Statement is a plan on how BLM will manage the Wood River property. The disposal of public lands and management of the Wood River property are separate actions.*

6 COMMENT ...[Some groups] oppose this land acquisition, if any portion depends on the subsequent sale (and logging) of mature and older public forest lands or revitalization of one endangered ecosystem at the expense and loss of another.

RESPONSE *The acquisition of the property, which is complete, and the plan describing how the property will be managed do not depend on the subsequent sale and logging of Federally owned timber lands. See response to comment number 4.*

7 COMMENT None of the wetland restoration planning process has adequately addressed these aspects of the potential loss of public land old growth forests—which would enable this proposed land exchange to take place.

RESPONSE *See response to Comments 4 and 5.*

8 COMMENT All botanical, cultural and other resource evaluations for both the Bly Mountain Area and the Wood River Ranch need to be [sic] completed before a final decision is made on the EA or Upper Klamath Basin FEIS.

RESPONSE *See response to comment number 4. The lands proposed for exchange in the Bly Mountain Area were surveyed for special status plants in 1994.*

*An inventory focusing on Applegate's milkvetch *Astragalus applegatei*, a federally listed endangered species, was conducted in 1994 on the loam soils that occur on the northern third of the Wood River property. Under all alternatives in the RMP, special status plant surveys would be conducted in areas proposed for ground disturbing management actions (See Chapter 3 - Management Alternatives - under "Special Status Species Habitat" in each alternative).*

The Klamath Falls Resource Area (KFRA) has completed such evaluations for the cultural resources. Presently, the KFRA is in the process of consulting with the appropriate agencies, Tribes, and specialists regarding these surveys. Such evaluations and consultations are an on-going, continual process.

The Bureau's multi-level decision-making process is designed to incorporate information at a variety of scales and assumes more site-specific information will be collected, analyzed, and considered prior to soil disturbing activities. Field officials have wide discretion on how supporting records will be incorporated or referenced in environmental analyses and decision records. Some reports may be protected (or not published or made readily available) in order to limit the release of information which could actually lead to deliberate resource destruction or removal.

Although it is highly desirable to complete all field evaluation aspects prior to environmental analyses, it is not always feasible to do so due to seasonal flowering of special status plant species or snow cover or frozen ground in areas with potential cultural resources. We note that some surveys may not be required if the project area was previously disturbed, such as road resurfacing or closures. There is nothing in BLM procedural guidance that precludes provisional decision-making or modified Findings of No Significant Impact. In addition, the Oregon State Director has indicated that field experience has shown that botanical or cultural sites, when found, are generally of limited geographic size. Project redesign or reconfiguration may be readily accomplished while meeting both project objectives and schedules. We find the PRMP's potential use of staged decision-making and deferred field evaluations appropriate and acceptable practices, as well as necessary to the timely and full implementation of approved RMP's.

Public Input

- 9** COMMENT ...the ongoing plans for the Wood River Ranch project be shared on a regular basis while it is being implemented.

RESPONSE *It is our hope to keep the public updated on Wood River projects by using interpretive signs or panels on the property. Your suggestion for a more "temporary" display that could be updated more easily as projects are implemented will be considered as we implement the plan. In addition, the Wood River Wetland Team will be used to provide input on the continued management of this property.*

Goals and Objectives

- 10** COMMENT ..."maintain the current use of the north half of the 3,200 acre Wood River Ranch as predominantly an irrigated pasture for livestock grazing and Canada Goose habitat". The committee would like for the BLM to limit the EIS to the Wood River Property only, not only in title but also substance.

RESPONSE *This first point is addressed in Chapter 3; please see "Alternatives considered, but dropped from further analysis".*

This Environmental Impact Statement is directed toward the management of the Wood River property. If lands in the area are acquired in the future with the same goals, they could be managed similarly.

- 11** COMMENT We also encourage the Bureau of Land Management to limit the EIS to the Wood River Ranch property until results of the test plot are evaluated.

RESPONSE *We have considered this comment and have addressed it in Chapter 1 under "Purpose and Need".*

- 12** COMMENT 'To improve the quality and quantity of water entering Agency Lake.' This statement again is beyond the scope of the original intent of the Wood River property purchase agreement as provided by the Klamath Basin Water Resources Advisory Committee and the WRWT consensus (fall 1993 meeting). ...To say that the objective of the project is to improve the quality of water entering Agency Lake is far too broad and beyond the scope and influence of activities on the Wood River property. The Plan should focus on what is "doable" and measurable within the confines of the property.

RESPONSE *The goals statement has been modified to reflect that the wetland restoration action goal is to improve the quality and quantity of the water delivered to Agency Lake from this property.*

- 13 COMMENT** ...we recommend the objective statement be expanded to focus not only on Lost River and shortnose suckers, but also on spotted frogs which for all practical purposes are close to be extirpated in Klamath County...leaving management of spotted frogs, yellow rails, and tri-colored blackbirds as management by-products.

RESPONSE *The objective statements for each alternative are general. The objective statement for special status species emphasized endangered suckers because of the high potential to contribute to the recovery of these species. There is no intentional implication that the BLM would not manage for other special status species habitat.*

Monitoring

- 14 COMMENT** ...a monitoring question or two should be directed at addressing channel recovery after dredging has ceased.

RESPONSE *The Proposed Monitoring plan includes measuring channel morphology and substrate composition after reconstruction and at 5 to 7 year intervals.*

- 15 COMMENT** ...I presume the discussion on vegetation monitoring includes collecting baseline data. This is not clear in the document.

RESPONSE *Baseline data for vegetation is addressed in Appendix 3 Wood River Wetland Plan Monitoring under Vegetation.*

Analysis

- 16 COMMENT** ...Alternative D lacks detail on implementation,...

RESPONSE *Significant detail has been added to Alternative D based on additional information that has been acquired since the draft Resource Management Plan/Environmental Impact Statement was prepared.*

Wetland Restoration

- 17 COMMENT** ...east side and south side dikes would be opened and a more natural circulation of the waters and mingling with the lake waters could be allowed...I would like to see the maximum amount of water allowed on the land to allow various depths and various types of marsh.

RESPONSE *This comment has been considered and addressed in several ways throughout the revised Chapters 3 and 4.*

- 18 COMMENT** Let this area return to its natural state by letting nature perform 95% of that activity. Nature will furnish the water, the plants and the animals without our help.

RESPONSE *This comment has been considered in the development of alternatives in Chapter 3. Subsidence, wind erosion, and oxidation of peat soils have created a condition that would not make wetland restoration possible, on most of the property, without artificially regulating the hydrology. Therefore, artificially regulated water levels will be necessary to accelerate the accumulation of peat. Once 24 to 36 inches of material has accumulated, the system could become open to the natural influences of the adjacent water bodies.*

- 19** COMMENT We recommend the production of a one page detailed drawing of each restoration proposal as described in Appendix 7. This would enable those of us who are not familiar with the property an understanding of what the Wood River Wetland Team is visualizing.

RESPONSE *Schematic drawings have been added for each alternative in Chapter 3.*

- 20** COMMENT Wetland Restoration, last sentence: This is confusing, please clarify. We understand that a palustrine system, that is being restored, takes 5-10 years for the vegetation to become established before the system is fully function (sewage treatment through wetland creation in Tualatin, OR. and Arcata, CA.)

RESPONSE *This section has been clarified. Please see "Wetland Restoration" in this proposed plan.*

- 21** COMMENT Agricultural use has occurred for more than 100 years in the region, dating back to at least the Swamp Act and probably to 1860.

RESPONSE *Aerial photographs indicate that the Wood River property was a wetland until the mid 1940s, and that wetlands were still being reclaimed on the property in the early 1970s.*

- 22** COMMENT How much water does a wetland community consume?

RESPONSE *In general, this has been addressed under Water Quantity. Specifically, it will depend on a number of factors, and will be unknown on this site for some time.*

Water Resources

- 23** COMMENT Chemicals "such as fertilizers and herbicides" are generally not used in this region, thus are not a prime contributor to poor water quality.

RESPONSE *The water resources section has been reworded.*

- 24** COMMENT The use of the words "fair" and "poor" are relative terms, what is the standard? It has been documented that the "natural" lake water quality at the turn of the century was poor.

RESPONSE *The water resources section has been reworded.*

- 25** COMMENT Is it nutrient-rich "irrigation return" water or nutrient-rich surface water? We suggest irrigation return water should not be the culprit without definitive proof.

RESPONSE *The water resources section has been reworded.*

- 26** COMMENT Clarification needs to be made with respect to the water rights of the property. We assume the water rights of the Wood River Ranch will be disposed of as stated in the "Land Tenure" section, page 3...

RESPONSE *The water rights for the property are discussed on page 2-3. Under all alternatives, the appropriate use of these certified water rights will be adhered to according to Oregon State water laws.*

- 27** COMMENT In the discussions of dissolved oxygen on pH levels, change the word "concentration" to "proportion". This word better describes the situation.

RESPONSE *An appropriate change has been made.*

28 COMMENT Wetlands may have improved the capacity of the lake but it is unclear if storage was "improved" since transportation of wetland flora is much greater than cropland or pasture lands. A study on the net effect on available water should be included in the project. We may increase lake capacity and storage but have a net loss of water due to transpiration of wetland plants. We recommend that the sub-heading be added to this section which deals with water storage and the net effects of wetlands restoration to available surface water/ground water. Possibly on page 16, after the third paragraph.

RESPONSE *A water quality section has been added in Chapter 2 to clarify this point.*

29 COMMENT 'Massive blooms of algae' may occur. What does the work 'massive' mean—large enough to cause pH in excess of 11 and fish kills?

RESPONSE *An addition to clarify our language now says that a pH greater than 10.0 defines "massive blooms of algae".*

30 COMMENT The FEIS should discuss dredged channels within the Wood River floodway.

RESPONSE *Dredging of channels has been addressed under Stream Channel Restoration options in Chapter 3.*

31 COMMENT ...if channel dredging within the Wood River floodway is to continue then some type of monitoring...should be initiated to measure the environmental affects on the aquatic ecosystems.

RESPONSE *Continue dredging of the existing channels is not planned. However, water quality monitoring planned for the area should reflect any changes due to dredging.*

Wildlife/Special Status Species

32 COMMENT ...feed production would be considered on at least higher parts of the property so it would still be attractive to migratory birds.

RESPONSE *The cultivation of agricultural crops is not consistent with the goals for this property. However, a number of native plants that will likely become established on the property are excellent waterfowl food sources.*

33 COMMENT Special Status Species Habitat, all Alternatives: Shouldn't the section in parenthesis in all of the alternatives include state sensitive species since BLM's policy is to ...'CARRY OUT MANAGEMENT FOR THE CONSERVATION OF STATE LISTED PLANTS AND ANIMALS.'

RESPONSE *The "carry out management for the conservation of state listed plants and animals" directive from BLM refers to species listed as state threatened or endangered. This is consistent with the language used for federally listed plants and animals. State sensitive species are awarded the protection provided by the policy for Federal candidate species as the minimum level of protection (BLM manual 6840, page 06B1).*

34 COMMENT Fish and Wildlife Habitat, first paragraph, last sentence: '...livestock grazing...couldn't be used to create diversity and edge effects within the wetlands.' BLM needs to be careful they aren't trading off an uncommon habitat in the Wood River Valley for a common one by using cattle to create diversity and edge effect...

RESPONSE *Livestock grazing could be used to accomplish the long term goals of the project. Examples could be maintain certain vegetation conditions for shallow water or ephemeral wetlands. The result of this could be more diverse habitats or more edge.*

- 35** COMMENT...second paragraph, Planting: Why is the plan assuming that exotic plant species will be planted to provide additional forage for domestic livestock? Please clarify how this management prescription will help the area's goal [sic] or objectives, or will be innocuous to this end.

RESPONSE On the page referenced (4-10), planting is defined and the possible effects on vegetation are described. Bureau policy directs that native species are to be used for planting if practicable. However, exotic species could be used if those species would better meet specific objectives. Planting is not prescribed as part of any alternative, but could be used under any alternative to achieve specific objectives. These objectives include forage for wildlife, provision of habitat features for wildlife, livestock forage, and/or stabilization of disturbed areas (see page 4-10).

- 36** COMMENT Alternative D, Objective, top right hand column: add '...federally listed suckers, spotted frogs, other listed species and for waterfowl...'...Special Status Species Habitat, Objective: 'federally or state listed or...'...Fish and Wildlife Habitat, Objective: This needs to be expanded to address spotted frogs and other listed species.

RESPONSE Appropriate changes have been made in this portion of the Resource Management Plan, to better state the objectives.

- 37** COMMENT ...second paragraph: add 'Nesting Islands and/or upland areas could be developed for waterfowl nesters who prefer tall rank vegetation.' We wouldn't want to see developments that would increase goose damage problems by creating nesting habitat for more geese or creating nesting conditions for gulls who might predate spotted frogs.

RESPONSE The wording has been changed to better reflect the intent of management under this alternative.

- 38** COMMENT ...last paragraph, right hand column: We feel the Bureau could remove the fence wire and leave the posts, thereby eliminating wildlife hazards and yet retain perching sites.

RESPONSE The wording for this section has been changed to better communicate the effects of removing the outbuildings and corrals on wildlife. The wire could be removed from fences and the posts left in place under Alternatives B, C, or D.

- 39** COMMENT ...Wildlife Habitat, Monitoring Questions: How about monitoring sensitive, threatened and endangered species and projects to enhance or maintain these species? How about the development of a self-service check list where visitors monitor observed wildlife, in particular sensitive, threatened or endangered species...Also, you might want to reference the Oregon Wetland Methodology for expansion of existing monitoring questions or development of additional monitoring questions.

RESPONSE More specific information regarding wildlife and special status species habitats have been added to the monitoring appendix.

- 40** COMMENT ...Natural Processes and Systems, first paragraph: Needs to be amended to address spotted frogs and other listed species.

RESPONSE This wording has been changed to better reflect the project goals statement.

- 41** COMMENT ...Introduction, second paragraph, second sentence: should add '...at least periodically saturated with or covered by water during part of the active growing season.' This statement should be consistent with SCS's wetland definition.

RESPONSE This change was made to be consistent with the definition used by other agencies.

- 42** COMMENT The term 'refugia' should be clearly defined since there are a number of definitions given the fish species and growth stage of the species.

RESPONSE *In this case, refugia refers to places in a water body that provide food, resting places, and shelter for young fish. This includes a range of habitat features including emergent vegetation, channel roughness and complexity, and vegetated flood-plains.*

- 43** COMMENT ...the riparian areas provide important habitat for many neotropical migrant/nesting species, and thus, need to be assessed along with the dike habitat improvements.

RESPONSE *This is included in Appendix 3 Wood River Wetland Plan Monitoring under both Vegetation and Riparian Areas.*

- 44** COMMENT ...reference should be made [in the FEIS] for nesting structures...within the riparian area in addition to those placed for raptors and waterfowl.

RESPONSE *This sentence has been edited to include other wildlife species.*

Vegetation

- 45** COMMENT Foxtail grass is found on the Wood River Ranch and could become a major problem (in terms of propagating the weed) if adequate controls are not put in place...

RESPONSE *Implementation of alternatives B, C, or D would significantly reduce the amount of foxtail grass present on the site.*

- 46** COMMENT Will conservation [sic] of grasslands to wetlands result in the loss of native grassland species? Should this be avoided? Will the grassland habitat suffer irreparable harm?

RESPONSE *Native grasses adapted to wetland conditions, such as tufted hairgrass (*Deschampsia caespitosa*), would become more abundant, dense, and widespread on the property as a result of wetland restoration actions. Both native and exotic grasses, such as quackgrass (*Agropyron repens*), adapted to the artificial, disturbed upland conditions currently occurring on the property would become less abundant, dense, and widespread (see Chapter 4-Vegetation Section). Pasture grass "habitat" would be decreased on the property, but would not suffer irreparable harm across the landscape.*

- 47** COMMENT ...I recommend establishing photo points for the vegetation sampling areas similar to what is being proposed for the riparian monitoring process.

RESPONSE *Monitoring of the effects of restoration actions on vegetation includes the establishment of fixed photo points for qualitative assessment of vegetation changes. In addition, vegetation plots will be established within the areas to be restored to wetland to quantitatively monitor vegetation changes. Also, transects will be established across riparian areas to monitor the effects of restoration actions on vegetation in these areas.*

Recreation

- 48** COMMENT Alternative B identifies only one boat ramp near the bridge location - I feel this should be added to the preferred alternative except it should be a primitive boat ramp (used only by small boat or canoe that can be carried on top of a vehicle).

RESPONSE *In the proposed action we have incorporated the recreation objective to provide more (semi-) primitive recreation experience opportunities. For the Proposed Resource Management Plan, we have dropped the two boat ramps of the Draft preferred alternative, and have proposed a primitive boat ramp suitable for launching a small boat or canoe near the Wood River bridge. (See Alternative D, Recreation).*

49 COMMENT Let's keep it a "NO MOTORIZED VEHICLE" area from Oct.1-April 1...

RESPONSE *For the proposed action, motorized access would be restricted during hunting season. The Bureau of Land Management could allow for greater motorized access and increased use levels the rest of the year. Which roads would be open or how much motorized access would be allowed during non-hunting periods would not be determined until recreation use levels are established and wetland restoration projects are defined. It would also be dependent on minimizing disturbance to nesting waterfowl or other sensitive wildlife species. (See Alternative D, Recreation).*

50 COMMENT Prior to passage of the "AuCoin \$1,000,000 Wood River Acquisition Act", members of your staff, and members of Congressman AuCoin's staff, assured officers of our Association that, if the ranch were acquired, BLM would apply its traditional hunting policies towards its management. That is, all areas of the ranch would be open to hunting except for minimal (reasonable) safety set-a-sides. We trust that will be so.

RESPONSE *This has been addressed in Chapter 3 and 4 under Recreation.*

51 COMMENT ...in recreation planning that there probably are-and will be- more users who are not hunters, and for whom the use of motors is incompatible with a quality experience.

RESPONSE *See the response to comments 48 and 49. In addition, for the proposed action we have included the statement that small motorized boats could be allowed to enter the wetland areas, during times when waterfowl nesting is not occurring. During the spring months, it is likely no motorized boats or vehicles would be allowed within the wetland areas. This should provide for a high quality recreation experience with abundant waterfowl and wildlife for viewing.*

52 COMMENT ...[area manager's] comment last week that the BLM has historically provided more "primitive" type recreational experiences—and there is a need for that.

RESPONSE *Bureau of Land Management lands are noted for the underdeveloped, wild nature of recreation opportunities. For the Wood River wetland, as stated in the proposed action, we will be providing for more primitive recreation experiences than provided for in the Draft preferred alternative. Also, see responses to comments 48, 49, and 50.*

Livestock Grazing

53 COMMENT And how do you justify livestock grazing as a 'management tool' to restore wetlands? Perhaps you should get out in the field and look at some of the mudholes and impacted soil left after a herd of cows has eaten every green plant in sight.

RESPONSE *Livestock grazing is not proposed as a tool to "restore wetlands", it is one of many tools to manipulate vegetative communities once wetlands have been restored. Livestock can and have been used as a management tool, in many types of vegetative communities, to reduce vegetative biomass when such an objective is useful to achieve desired results. It can be a cheap (or even revenue generating) method to accomplish particular vegetation manipulation goals. At no time will the use of livestock be such as to jeopardize or even minimally subvert the overall goals for management of the Wood River property.*

54 COMMENT ...continued grazing on the north half of the ranch,...is contrary to the objectives of wetland restoration.

RESPONSE *This is addressed in Chapter 3 "Alternatives considered, but dropped from further analysis".*

55 COMMENT The BLM needs to adapt one or more alternatives to the Upper Klamath Basin EIS that does not include grazing.

RESPONSE *Alternative B has been modified so that it no longer includes grazing.*

56 COMMENT ...the BLM needs to analyze if grazing around the Wood River Ranch would be in violation of the Administration's recently announced "Pacfish" proposal which requires buffers of 300 feet on either side of fish-bearing streams, and 150 feet on either side of permanent non-fishbearing streams and around ponds, reservoirs and wetlands larger than 1 acre.

RESPONSE *The Pacfish strategy does not apply in the Upper Klamath Basin because there are no anadromous fish. All grazing management options would follow standards and guidelines at least as restrictive as those in Pacfish. The BLM, Lakeview District has adopted interim Pacfish standards and guidelines until such time as these are superseded by any future Interior Columbia Basin Ecosystem Management Project assessment directives.*

57 COMMENT Effects on Livestock Grazing...First this section portrays that cattle grazing at the same levels could continue under BLM ownership. ...We recommend this whole section be reworked to very adequately display what maximum AUM numbers could occur under governing rules and regulations (pgs. 1-5 and 1-6) along with a thorough discussion on why these numbers will be reduced or eliminated. ...This importance needs to be thoroughly reflected in the plan's rationale for livestock reduction or elimination.

RESPONSE *The "Effects on Livestock Grazing" in the draft Resource Management Plan/Environmental Impact Statement compares the effects of the action(s) proposed to the current management, which at the time the draft was prepared was continued high intensity cattle grazing. This comparison of effects is a requirement under the National Environmental Policy Act. The Proposed Resource Management Plan/Final Environmental Impact Statement does set maximum grazing levels that would be allowed if necessary to achieve the primary resource goals for the property. As with any grazing on BLM lands, current laws, regulations, and policies as well as the decisions made in the Klamath Falls Resource Area Resource Management Plan would be adhered to.*

58 COMMENT Livestock Grazing, second to last sentence: Why would the allotment be categorized as an 'M' allotment when, for the most, the bulk of the area will be undergoing some very major vegetation transformations in addition to the potential of having 23 listed species on the area. Wouldn't this be categorized as an 'I' allotment where major investments and modifications need to occur to the grazing program in order to meet the area's goal and objectives?

RESPONSE *The allotment categorization process pertains largely to livestock use as it relates to resource values and other multiple use considerations. Categorization of the Wood River property as an "M" or "Maintain" allotment is due to the expectation that grazing use on the allotment would cause little or no resource use conflicts. This is largely because little (compared to past levels) to no grazing use will occur on the area in the foreseeable future except under Alternative A*

59 COMMENT ...with the water level management options that will be available for the majority of the site, grazing should not be necessary for vegetation control except, perhaps, in the higher elevation areas at the north end of the property. In the event that grazing is used as a "management tool" it might be an interesting experiment to compare different management scenarios in adjacent plots.

RESPONSE *Under Alternative D (proposed action) in the Proposed Resource Management Plan/Final Environmental Impact Statement, water levels will largely preclude any livestock grazing on the property. Depending on future goals or objectives for management of the property, proposals such as yours could be pursued. At this time, however, there are no plans to conduct grazing related studies on the property.*

- 60 COMMENT** The ranch still has ASCS barley base of about 1,000 acres. Barley would add food production for both waterfowl and pheasants, helping hold waterfowl on the ranch much longer in the winter. Barley is also needed for testing of water quality changes, if the test area is to adequately represent Klamath Basin agriculture. Cattle grazing should be included for similar reasons.

RESPONSE *These agricultural uses are not consistent with the goals of restoring the property to a functioning wetland.*

Cultural Resources

- 61 COMMENT** The village site, located at the mouth of Wood River, has been known throughout Tribal memory.

RESPONSE *This statement has been acknowledged in Chapter 2 and in Appendix 4.*

- 62 COMMENT** Tribal members are still using that area of the Klamath/Agency Lake to gather Wocus, a water lily whose seeds are rendered down to many different products, which in pre-contact times, were the one of the main staples [sic] of Klamath subsistence.

RESPONSE *This statement has been acknowledged in Chapter 2 and in Appendix 4.*

- 63 COMMENT** ...management of the area [should] include strong protective measures for the cultural resources in the area.

RESPONSE *The area is protected by a strong body of law covering cultural resources. See page 1-6 of the draft plan where many of these laws are listed. These laws will be followed by the BLM.*

- 64 COMMENT** A portion of the property which had been considered as part of the Klamath Agency property had not been taken out of Tribal ownership until Termination which began in 1954 and probably occurred circa 1961. ...It is within the scope of protection of Klamath Tribes' treaty Rights and federal fiduciary responsibilities to maintain those nonrenewable cultural resources as much as possible for the betterment of the Tribes and general public.

RESPONSE *See response to comment Number 63.*

- 65 COMMENT** Tribal members, written documentation, film and photo archives, etc., [should] be reviewed before ground disturbing activities begin. This is to ensure that no Tribal, federal, state or local laws be violated.

RESPONSE *The Klamath Tribes must determine if it is within their own best interest to share information with the BLM. The Klamath Falls Resource Area has in the past met with the Tribes and plans to continue to meet with the Tribes on a regular basis to discuss such concerns. If the BLM is not given specific information regarding important or significant sites it is impossible for the BLM to protect undisclosed sites. Where important and/or significant sites are known to the BLM those sites can be protected.*

- 66** COMMENT [...]the design of the [ongoing and future] project [s should] be shared with the Cultural component for review in order to assist in the possible desecration of sacred sites [sic].

RESPONSE The design of the Wood River wetland restoration project has been and will continue to be discussed between the Klamath Falls Resource Area BLM office and the Klamath Tribes. Desecration of sacred sites will be avoided. See the response to Comment 65.

- 67** COMMENT There are references to the winter villages along the lower Wood River /Eukalksni qoqel/ and at a spring one quarter mile east of the mouth of the river in all of the sources researched. The main village is called /Kowa'cdil/ or Kohasti, and is home village for what is called the Agency Lake Group or Wood River Group of the Klamath Tribe.

RESPONSE This information has been noted, and is acknowledged to the extent that it is consistent with other sources in Chapter 2.

- 68** COMMENT The specific area of the Wood River Ranch BLM property is the most important wocus gathering area on the east side of Agency Lake. It is also a hunting area for many species of water fowl, a fishing area, a place where duck and geese eggs are gathered, and an area for collecting the roots and plan fibers of such plants as tules and cattails.

RESPONSE This information has been noted, and is acknowledged in Chapter 2.

- 69** COMMENT Dino Herrera, responding to a call regarding a sighting of persons violating this site with shovels and archaeological screens, observed a large disturbed area with dense lithic deposits at the mouth of the Wood River.

RESPONSE A call to the BLM in such situations would allow the BLM to provide law enforcement actions to help prevent or to pursue legal actions against anyone breaking the law on public lands.

Socioeconomic

- 70** COMMENT In a direct fiduciary sense, dollar losses are displayed for the livestock operation, where dollar gains are not displayed for the 1-2 employees necessary to operate the area, the restoration activities that are going to occur in the next 2-4 years, or the \$26,000 that will be spent on monitoring annually. Additionally, no socio-economic discussion is presented as to benefits the property will provide the Klamath Basin by working to de-list or keep species from being listed, potential money generation through additional recreational opportunities or how the area ties in with the tri-county tourism plan.

RESPONSE The text has been modified to show estimated contributions to the local economy from increased recreational use, salaries of new employees, construction costs, and expenditures for monitoring the plan.

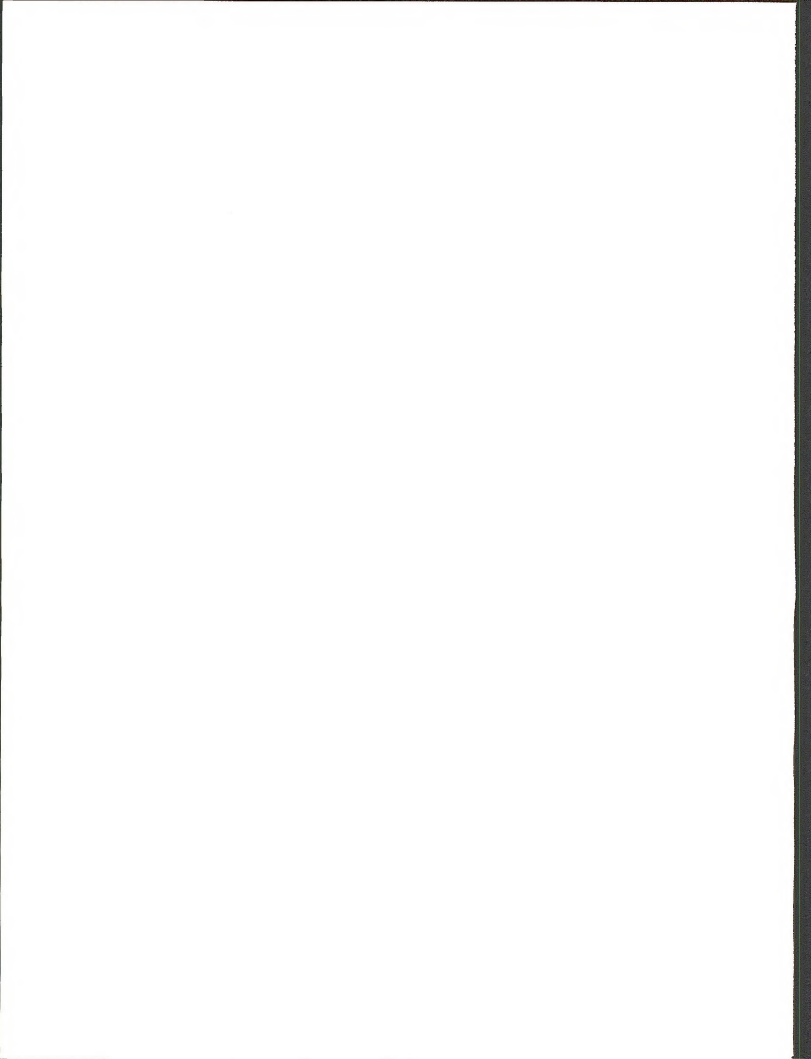
Benefits to the local economy from efforts to remove species from the endangered species list and benefits from improved water quality entering Agency Lake are highly speculative. We believe these beneficial effects could occur but there is no guarantee that they will and to assign a dollar value would be misleading.

71 COMMENT ...discuss the socioeconomic impact upon the Klamath Basin economy of withdrawal of this land from cattle grazing. This analysis may have validity as a general argument for irrigated pasture, but is totally inappropriate to the actual operation of the ranch. John Patous, the former owner, specifically contradicted similar economic arguments by citing the actual operation they conducted. He said he and his hired man spent 6 months on the ranch, and purchased groceries and gasoline here during that time. He said that the cattle came from California and went back to California and has no economic influence in this basin. This is the way it actually was, and it shouldn't be ignored in favor of some general or theoretical situation.

RESPONSE *The economic analysis reflects estimated dollar impacts to the local economy with the property under BLM ownership. The estimated effects are not specific to any particular livestock owner or rancher.*

72 COMMENT We recommend equivalent "value" is more equitable than 'acreage' for land disposition to offset local tax revenue loss.

RESPONSE *Please refer to the draft RMP/EIS page 1-8 for a discussion on equalizing tax rolls and our rationale for the option selected.*



RECEIVED MAR 15 1994 001

March 12, 1994


Cathy Humphrey
BLM
Klamath Falls Resource Area
2795 Anderson Ave., Bldg. 25
Klamath Falls, OR 97603

We are commenting on the Upper Klamath Basin Resource Management Plan.

The area should be restored to as natural a condition as feasible. Dikes and other manmade structures should be breached/removed if that would return to area to a more natural functioning ecosystem. Wildlife should be the main concern, especially the suckers. We agree that cattle should be removed. We also believe the area should be closed to hunting and wildlife viewing should be the main recreational pursuits.

Recreational use could soon become a major problem given the general lack of lake/river access in the immediate area. The plan should more fully allow for closures of parts of the area should recreation use degrade the ecologic attributes of the area. If a boat launch is considered for the future, it should be primitive, for hand launched boats.

Sincerely,


Rhonda W. Osterberg
Georges and Rhonda W. Osterberg
4303 25th Ave. NE, # 13
Salmon, OR 97303



Protecting Oregon's lands,
water and natural resources

March 26, 1994

A. Barron Ball, Tom Cottingham and Cathy Humphrey
Bureau of Land Management
Klamath Falls Resource Area
2795 Anderson Ave., Bldg. 25
Klamath Falls, OR 97603

Dear Barron, Tom and Cathy,

The following constitutes our scoping comments on the proposed Bly Mountain land exchange and the March 1994 Upper Klamath Basin Draft Resource Management Plan Environmental Impact Statement.

In conversations with your staff ONRC has just learned that portions of the funding for the purchase of the upper portion of the Wood River Ranch is potentially contingent on the exchange of BLM forest lands that are forested with mature and old growth ponderosa pine. A still undisclosed amount and area of old growth ponderosa pine (and other species) would be traded to the American Land Conservancy that now owns the Wood River Ranch. The Wood River Ranch would then be traded to the BLM, and the American Land Conservancy would then sell the forested land to Jeld-Wen Inc. of Klamath Falls, Oregon. BLM would preclude over the flooding of the ranch, and Jeld-Wen would preclude over the clear cutting of the trees. When I spoke this afternoon to Harris Burgess of the American Land Conservancy she told me that the Conservancy was unaware that the trade included old growth forest lands. ONRC is concerned that the public doesn't know this either.

As much as we support the Wood River Ranch acquisition and the restoration of this marsh ecosystem, ONRC will be forced to protest and otherwise oppose this land acquisition and FEIS, if the acquisition of any portion of the Wood River Ranch depends on the subsequent sale (and logging) of mature and older public forest lands. We cannot in good faith support the revitalization of one endangered ecosystem at the expense and loss of another.

For this reason ONRC strongly encourages BLM to not propose any comparable value land exchange where the majority of dominant, overstory trees are over 16 inches in diameter, or that are characteristic of "Early Late Seral" forest (or older) as defined by US Forest Service Area Ecologist Bill Hopkins in "Descriptions of early, mid, late and very late seral conditions for ponderosa pine, lodgepole pine and grand fir/wire fir." I have enclosed this paper for your reference. Under "Early Late Seral", Hopkins states: "Important differences between this seral stage and late mid seral is presence of large trees (in the late seral stage only) dbh's = 16 - 21" and fairly equally distributed across the stand" (generally defined as being 16 - 21" and fairly equally distributed across

Of the potential sites of BLM forest areas that are being considered for exchange most include trees that range from 14 to 40+ inches dbh. (In 1373 RGE Sec. 3, trees up to 50 inches dbh are identified among the potential exchange parcels.) Many of these old growth groves are separate from BLM's principle land holdings in the Klamath Resource Area, and may thus represent the only older and ancient forest habitat of their kind for miles around. While BLM justifies these types of land exchanges for the goal of consolidating their land base, the Wood River/Bly is every bit as disjoint from the rest of BLM's Klamath Resource Area holdings as are the forested areas presently being considered to be given up as part of this land exchange.

At a minimum, BLM needs to display and adopt an alternative to the Bly Mountain Land Exchange EA that would trace range or forest lands (of comparable value) for the remaining portions of the Wood River/Bly that do not contain mature and/or (late-race) forest types. This exchange should instead include greater acreages of forest lands of comparable value (in "sustained" production), where the larger and more ecologically valuable trees have already been removed.

The Upper Klamath Basin (Wood River/Bly) EIS needs to consider and analyze the potential environmental, management alternatives, and environmental consequences for the entire proposed project. These legally required analyses have only been done in the context of the Wood River/Bly Wetland restoration project itself. None of the potential planning process has adequately addressed the consequences of the potential loss of public land old growth forests--which would enable this proposed land exchange to take place.

The BLM's Wood River/Bly Acquisition and Wetlands Restoration Project has been widely promoted by the Bureau (in the BLM News and elsewhere) as an example of the agency's overall ecological concern and environmental sensitivity. Little or no mention has been made to the public that this habitat restoration project is now to be built on the stumps and potential clear cuts of centuries old ponderosa pine forests.

It is a violation of NEPA for the BLM to do a split decision for the proposed Bly Mountain Land Exchange (in the context of an EA), and not include these issues as part of the overall EIS which this project is directly related to the same. BLM must analyze and disclose as part of the Upper Klamath Basin FEIS which specific issues are to be ultimately sold to Jeld-Wen Corporation (or any other private company).

On March 22, 1994 the BLM sent a letter to the Wood River/Wetland Team Members inviting them to a "field trip to Wood River on Wednesday May 4 at 9:30 am." Similarly, the Wood River Team Members should be allowed to tour and discuss the forests that will be traded to make this wetland project a reality. NEPA requires that they and other members of the public have the opportunity to comment on all aspects of this proposal.

On page 2-1 under "purpose and need for action" of the Upper Klamath Basin (Wood River/Bly) DEIS, BLM states: "Because restoration of the property to wetlands would significantly affect the natural and human environment, it was determined that an environmental impact statement was needed." For the same reason, this land exchange that would impact a still undisclosed amount and specific area of old growth ponderosa pine forested upland Bly Mountain, must be similarly identified and analyzed in the same EIS.

Floyd writes: "On former Klamath Reservation lands, 1991-1992 surveys and observations by Tibbal and Forest Service biologists confirm 6 isolated pairs. Multiple pairs have been found in 1 or 2 locations."

Randy Floyd states:

"Historical distribution of the pileated woodpecker in south-central Oregon was undoubtedly more widespread than today, as the species is believed to have occupied mature and old-growth pine associated stands and fire-scarred ponderosa pine stands. Over the past 40 years, as timber and commercial timber harvest, numbers of large snags are believed to have been more abundant than today, providing suitable nesting, roosting and foraging habitat across many more acres than exist today."

"The survey results and observations from the last few years indicate a southward and degree of isolation of individuals in single pairs presently living in south-central Oregon. It is believed that sites currently occupied by single pairs once were larger and supported multiple pairs. Based on her research, Evelyn Bull (with the Habitat Institute) has determined that suitable habitat areas large enough to support multiple pairs of birds, allowing dispersion of young and maintenance of a viable population over time."

"The current isolation of single pairs and individuals, and the documentation of disappearance of pairs, is an indication that they are probably experiencing a downward trend, and that the single pairs cannot sustain themselves over time."

The Lakeview District BLM needs to assure that it maintains snags and green replacement-foot trees of greater than 15 inches dbh at 100% potential population levels of primary cavity excavators before it proceeds with any land exchanges involving the trade of ultimate state of old growth forest areas. In addition, we also require available data on species requirements as applied through current snag models or other documented procedure (such as the annotated paper by Bill Hopkins).

Evelyn L. Bull who recently published in the Journal of Wildlife Management 57 (2): 193, "Habitat Use and Management of Pileated Woodpeckers in Northeastern Oregon," recommends protection to some areas "more than 3 times the size of current prescribed management areas." Evelyn Bull now recommends "leaving more than 100 logs (about 40 per acre) in management areas, with a preference for logs greater than 38 cm (approximately 15 inches) in diameter." In addition, she also recommends "leaving greater than 6 snag/ha (approximately 3 per acre) for nesting, roosting, and foraging; at least 20% of these snags should be greater than 51 cm dbh (approximately 20 inches)."

The Klamath Resource Area BLM needs to more fully recognize the valuable role that dead and decaying material plays in the forest single pairs presently living in the exchange of old growth forests to restore area wetlands. BLM has failed to communicate to the public the beneficial aspects of dead and down trees for the maintenance of the health of older forest stands and wetland areas. In addition, we also require available data. (See Science section of the March 23, 1994 Oregonian: "Dead Wood, New Life by Joel Preston Smith.")

Before the Klamath Falls Resource Area BLM disposes of any mature or older forest (as in the context of a land exchange) the Bureau of Land Management further needs to produce an EIS and Land Management Plan that is consistent with the principles of landscape ecology and conservation biology. In the interim the BLM needs to adopt specific criteria by which to evaluate land exchanges and timber sales that may proceed during the development of the presently initiated easement EIS.

The Eastside Forest Ecosystem Health Assessment (Richard Everett, April 1993), coupled with the general lack of consistent BLM monitoring information, show cause for concern about the abundance and distribution of mature and older forest stands and the wildlife species associated with those habitats. The Eastside Forest Ecosystem Health Assessment also shows that the amount of old growth and mature forest types are in many watersheds significantly below historic levels.

Neither the Lost River MFP or the Draft Klamath Falls Resource Area Management Plan, to which this land exchange EA is potentially "tied," adequately addresses these issues as they are either dismissed or not mentioned. Please see ORO comments on the Klamath Resource Area Draft RMP of December 14, 1992. For example, the Draft RMP states: "no old growth emphasis as regards connectivity areas were designed in the Klamath Falls Resource Area." The Resource Area EIS also states: "no significant impact" for this proposed land exchange when the agency has no legally adequate plan or NEPA document on which to base this claim.

Rather than designing projects on an individual basis the BLM needs to address the latest information on what the habitat needs are of all fish and wildlife species on the District, and develop a plan by which those needs of those species will be identified and addressed on a landscape basis. Neither BLM (nor ONRC) can best judge what the best management for any particular piece of land is, or stand of trees, in the absence of such a more inclusive management document.

The Klamath Resource Area currently lacks sufficient snags and down wood material across the landscape to provide for the cover, roosting, and nesting needs of a variety of wildlife species including the northern goshawk, martin, pileated, white-headed, three-tooled and black-backed woodpecker. The July 1993 FEMAP Report states: "Three woodpeckers (black-backed, white-headed and three-tooled woodpeckers) rate less than 80 percent likelihood of achieving outcome (wide-distributed) under one or more options. All three species are primarily located in the eastern Cascades Province. Mitigation for these three species could include adoption of more restrictive guidelines for salvage in eastern Cascades Province" (IV-170).

The Klamath Resource Area BLM needs to identify which of the above species are found in the proposed Bly Mountain Land Exchange areas, and the present amount and quality of habitat being provided. The Klamath Resource Area BLM also needs to identify how retaining and managing these diverse habitat types might benefit these wildlife species. Additionally, the Klamath Resource Area BLM needs to identify what existing or yet to be created in these potential land exchange areas may potentially serve to restore forest health to areas of the Klamath District that were severely snag depleted, and what management practices would be necessary to restore species such as the pileated woodpecker closer to historic numbers.

In a October 19, 1992 paper, titled, "Pileated Woodpecker in South Central Oregon Status and Management Concerns," former Chemulm Ranger District Biologist Randy

Decaying, fallen trees are an important component of all forest ecosystems. Their presence on the forest floor helps to create and maintain the diversity of numerous microhabitats necessary to sustain the forest itself.

Many insects, which are found only in dead and dying trees, are also important in supporting predators that keep the ecosystem in balance. The natural process is that the newly down trees are first inhabited by bark beetles. These insects inoculate the wood with fungal spores and/or nitrogen-fixing bacteria. Later, the log is invaded by various wood-boring beetles. Carpenter ants enter as the moisture content increases. These organisms are important both as prey and as predators. In the Blue Mountains of northeastern Oregon, one group of carpenter ants, for example, feeds on the eggs, larvae and pupae of the western spruce budworm and the Douglas fir tussock moth. Numerous forest bird species that live in snags and mature forest trees do the same. By "cleaning up" the dead trees, we destroy the forest's natural ability to maintain its own health.

The decaying tree also acts as a reservoir holding water throughout the year, thus making it available during the dry months. In addition, the dead trees also act as support fish, this moisture is necessary for the survival of animals such as salamanders and various small mammals. Maser et al. 1979 reported that 176 vertebrates (14 herpetiles, 118 birds and 49 mammals) utilized downed logs in the Blue Mountains of Oregon and Washington. Brown (1985) found 130% (100% of all species) using downed logs for either breeding, feeding, or resting in western Oregon and Washington. While we have continued to remove these down trees, no one is replacing them.

The persistence of large logs on the forest floor has special importance in providing wildlife with habitat continually over long periods and through major disturbances (Franklin et al. 1981). Logs contribute significantly to the reestablishment of animal populations by providing pathways along which small mammals can venture into bare areas and these animals disperse spores of mycorrhizoids and nitrogen-fixing bacteria needed for the forest to grow.

Every tree in the Klamath Resource Area BLM has already been (or will someday) be penetrated by insects, swept with fire, inoculated with fungi, and will ultimately fall or blow down. If the timber industry in cooperation with over zealous timber managers and camp use site managers (including land exchanges) to justify their and subsequent logging of our public forest lands, then every large diameter tree will sooner than later be removed and the forest as a naturally functioning ecosystem will cease to exist.

Many of the forest pest problems already described that we are currently witnessing in northeast and south central Oregon are the direct result of the widespread and continued removal of standing and dead trees. The loss of this woody material is as detrimental to the forest as the destruction of the living trees.

In a June 1992 publication, "Sensitive Vertebrates of Oregon" by the Oregon Department of Fish and Wildlife, ODFW describes that both Black-Backed Woodpeckers and Three-Toed Woodpeckers sensitive status is due to the "removal of mature and insect-damaged trees from old-growth forests." The same document also states: "The conversion of mature and old-growth forest to young forest-growth stands that are relatively free of heartrot and bark beetles, as now practiced to control bark beetle outbreaks in lodgepole stands on the east slopes of the Cascades in Oregon."

All botanical, cultural and other resource evaluations for both the Bly Mountain Area and the Wood River Ranch need to be completed before a final decision is made on the EA or Upper Klamath Basin FEIS. For example, if it is not adequate for BLM to simply state in the upcoming Bly Mountain Land Exchange EA that "prior to initiation of the exchange, botanical, cultural and endangered threatened and sensitive species clearances would be completed if required by the area botanists, archeologist or biologists" as we have noted in other Lakeview District BLM decision documents. First of all, the term "if required" doesn't even promise that an analysis will ever be done. Secondly, some of those people that would be doing the analysis are often temporary employees. Very few decisions are ever significantly modified when the evaluations aren't completed until after the decision for the proposed activity has already been made. Resource specialists (and particularly temporary employees) are usually under too much pressure from senior resource managers (their bosses) to "make waves" and often barely have the authority to even recommend, let alone insist, that necessary after-the-fact modifications (that could hold up a land exchange) be made. Biological and cultural evaluation information should be used to assist the decision maker at the time the environmental assessment document is being produced. Otherwise, these evaluations are simply an meaningless field exercise from which, short of some spectacular finding, will in no way influence the decision that has already been made.

The BLM needs to adopt one or more alternatives to the Upper Klamath Basin EIS that does not include grazing for the reasons given in our letter of September 10, 1983--enclosed. In BLM's letter to Wood River Participants of September 23, 1983 it stated "An alternative which has been proposed to increase the amount of grazing was considered and dismissed because it was felt this was outside the reasonable range of management actions/alternatives that would fit under the purpose of improving water quality and restoring wetlands on the property." BLM has still failed to explain how any grazing will more readily enable the accomplishment of this wetland restoration goal. Yet, BLM in the OES, has not included the consideration of any alternatives that would preclude opportunities for grazing.

Finally, the BLM needs to analyze if grazing around the Wood River Ranch would be in violation of the Administration's recently announced "Pads" proposal which requires buffers of 300 feet on either side of fish-bearing streams, and 150 feet on either side of permanent non-fish-bearing streams and round ponds, reservoirs and wetlands larger than 1 acre.

Thank you for your consideration.

Sincerely,

Wendell Wood
Wendell Wood
South Central Field Coordinator
PO Box 687
Chiloquin, OR 97524

cc: American Land Conservancy

AMERICAN LAND CONSERVANCY

436 Montgomery Street, Suite 1480 • San Francisco, California 94104 • Telephone 415-393-8850 FAX 415-392-2420

March 31, 1984

A. Barron Ball
Area Manager
Klamath Falls Resource Area
2785 Anderson Avenue, Bldg. 25
Klamath Falls Oregon 97603

Dear Barron,

Congratulations on completing the draft Resource Management Plan & EIS for Wood River! Your handling of this whole project has been wonderful, a textbook example of doing it "the right way".

The restoration of the Wood River wetlands is an opportunity to expand the BLM riparian restoration program to the Klamath Basin. We are glad to be a part of this effort.

Please send us 2 more copies of the draft plan. We have already sent our copy to John Foubus and would like to have additional copies to showcase your good work.

Once again, congratulations on completing the management plan. We look forward to hearing from you about its success.

Sincerely,

Harriet Burgess
Harriet Burgess
President



Photos: HARVEY BARRON, GUYARD, DAVID B. BROWN, BOB DAVIS, W. E. GIBBY, L. W. LARSEN, MARTIN LUTHER, TERRY McCLINTOCK, PETER McCLINTOCK, MARGARET W. GIBBY, CLAREN LANGE, ROBERT SPENCER, STEWART GIBBY

April 15, 1984

A. Barron Ball, Joe Cottigman
Area Manager
Klamath Falls Resource Area
2785 Anderson Ave., Bldg. 25
Klamath Falls, OR 97603

Dear Sirs,

It is quite clear that your project to restore wetlands on the Wood River Ranch is tied to cutting of old growth Ponderosa pine at unspecified sites in your Lakeview District, although the newspaper articles conveniently failed to mention this side of the bargain.

This sounds like the same kind of deal I negotiated in the Howard Prairie area where an unpublished land exchange resulted in clear cutting over three hundred acres at the source of Hoxie Creek, one of the tributaries of Howard Prairie lake.

Where are you going to cut these "unspecified" parcels of timber? How many acres will be cut? How thorough was your EA on these sites? NEPA mandates that all aspects of these land exchanges be evaluated and the environmental impact on watersheds, fish, soils and wildlife be taken into consideration--and the public should have the right to know and comment on these actions. We want to see a thorough EIS on every parcel of timber that will be used in this trade-off.

And why is old growth to be sacrificed? There are many acres of sustained production forests of the future that could be used in this exchange without sacrificing our ever decreasing nature and old stands of Ponderosa.

And how do you justify livestock grazing as a "management tool" to restore wetlands? Perhaps you should get out in the field and look at some of the mudholes and degraded soil left after a herd of cows has eaten every green plant in sight. Have you forgotten that the problems of Upper Klamath Lake and tributaries is due to an excessive bloom of blue-green algae which in part is caused by runoff of cattle waste?

You need to draft more alternatives addressing these problems for public comment and information. The consequences to the environmental health of this area are too serious to be passed off in half-truths and mis-information.

Sincerely,

Wendell Wood

April 15, 1984

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Klamath Falls Resource Area
2785 Anderson Ave., Bldg. 25
Klamath Falls, OR 97603

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Sincerely,

Wendell Wood



006
April 15, 1964

John E. Coultas
201 Whiting Post Road
South Falls, Ore. 97633

A. Barron Hall, in Charge
Bureau of Land Management
Klanath Falls Resource Area
2755 Anderson Ave., Alder 25
Klanath Falls, OR. 97603

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Sincerely,

John E. Coultas

4621 Phelan Creek Rd.
Rogers River, OR 97533
April 15, 1964 008

A. Barron Hall, in Charge
Bureau of Land Management
Klanath Falls Resource Area
2755 Anderson Ave., Alder 25
Klanath Falls, OR. 97603

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Sincerely,

Elizabeth Kelle

RECEIVED
BUREAU OF LAND MANAGEMENT
APR 15 1964

007
April 15, 1964

A. Barron Hall, in Charge
Bureau of Land Management
Klanath Falls Resource Area
2755 Anderson Ave., Alder 25
Klanath Falls, OR. 97603

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Sincerely,

Janet Blair

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April 15, 1964

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Elizabeth Kelle
Elizabeth Kelle

RECEIVED APR 19 1994

April 15, 1994

April 15, 1994

A. Garrison Ball, Jon Cottingham
bureau of land management
Alamath Falls Resource Area
2755 Anderson Ave. rdg. 25
Alamath Falls, OR. 97603

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Sincerely,
David W. Fuller
DAVID W. FULLER

Sincerely,
Rimee L. Bushmaster
Rimee L. Bushmaster
1480 N.E. D.
Grants Pass, Or.
97526

RECEIVED APR 19 1994

RECEIVED APR 19 1994

April 15, 1994

April 15, 1994

A. Garrison Ball, Jon Cottingham
bureau of land management
Alamath Falls Resource Area
2755 Anderson Ave. rdg. 25
Alamath Falls, OR. 97603

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Sincerely,
Michael P. ...

Sincerely,
Mike Mathis
Mike Mathis
Grants Pass
OR 97526

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RECEIVED APR 20 1964

April 19, 1964

RECEIVED APR 20 1964

April 19, 1964

A. Barron Ball, Joe Cottingham
Bureau of Land Management
Alamoth Falls Resource Area
2765 Anderson Ave. Alder 25
Alamoth Falls, OR. 97603

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Sincerely,
Robert J. Duffin
14800 E. 25th St.
Shawtoogee, OR 97626

Sincerely,

Wm. V. Mrs. J. J. Russell

BJ & Mrs. Russell
2725 N. 10th St.
Gresham, OR 97030

RECEIVED APR 20 1964

April 19, 1964

RECEIVED APR 21 1964

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2765 Anderson Ave. Alder 25
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017

April 15, 1994

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bureau of Land Management
Klamath Falls Resource Area
2755 Anderson Ave. -ldg. 25
Klamath Falls, OR. 97603

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Sincerely,

Mary Poutant

April 15, 1994

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bureau of Land Management
Klamath Falls Resource Area
2755 Anderson Ave. -ldg. 25
Klamath Falls, OR. 97603

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Sincerely,

*Dandy Ross
1004 W3 Highway
Grand Ron, OR. 97126*

RECEIVED APR 21 1994

April 15, 1994

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bureau of Land Management
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2755 Anderson Ave. -ldg. 25
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Sincerely,

Mary Poutant

020

021

Thanks for a good meeting. I endorse your E.I.S. plans for Wood River Property and would like to see plans implemented as soon as possible after purchase of Northern half. Cattle are tools to cut grass when needed, but Monarchs filter water and produce wildlife - Your heading in the right direction - Go for it!

*I thank -
Paul White
Oregon Waterfowl & Wetlands Assoc
(Southern Director)*

Bureau of Land Management
Klamath Falls Resource Area
2795 Anderson Ave., Bldg. 25
Klamath Falls, OR 97603

JUN 16 1994



Upper Klamath Basin RMP/EIS

Public Meeting
May 3, 1994

Your Opinion Matters! We are asking for your input on the Upper Klamath Basin Resource Management Plan/ Environmental Impact Statement. The following types of responses will be the most helpful to the BLM in using public opinion and concern when making decisions about the plan:

- Stream and Wetland restoration methods
- Treatment or endangered species habitat
- Dredged plant communities
- Public use areas and facilities

Your responses are greatly appreciated. Please give us your comments tonight or mail them to the Klamath Falls Resource Area office, postmarked by May 31, 1994. Thank you.

Your comments are directed primarily towards public use and facilities. I believe that development of the parking areas proposed in the plan alternatives would detract from the natural resources present along Wood River. If any parking areas should be developed, one at the bridge way near the gate is the most needed. After that one at the bridge Wood River could be appropriate.

In the summer, access should be limited to the bridge at Wood River. Foot access from that point would allow fishing and wildlife viewing w/o disturbing wildlife over much of the property. Road maintenance would be minimized and chances of offuse would be limited.

In the winter - Wood River Ranch is a premier waterfowl (primarily geese) hunting area. Several thousand geese use the area on a daily basis.

Unfortunately, vehicle access and geese hunting are not very compatible. The vehicles coming and going scare the geese and late hunters. Even the parking area at the bridge would

The following information will be used for our community analysis:
Name: Tracy Linsley
Address: PO Box 17
City, State, Zip code: Klamath Falls, OR 97601

OVER →

rather with hunting on up to 1/2 of the ranch. I feel that a parking area should be developed at the gate on the paved road and access should be restricted to foot, goose art, etc. The Klamath Basin already has several goose hunting areas where vehicle access is allowed including Miller Island, State Line, Tule Lake. These areas allow vehicles to drive to & into fields & often times are either crowded and vehicle traffic can be heavy.

Wood River offers a unique opportunity for waterfowl hunters who are willing to work a little harder. Few other public areas like Wood River are available in southern Oregon. If the vehicle access is allowed in the winter time I would anticipate considerable problems w/ road maintenance & vehicles getting stuck in the mud and snow. I could also anticipate vehicles, including hunters attempting to drive on the pasture and marsh areas.

Unfortunately, bird watching and hunting are not very compatible - Wood River would probably have to be limited to geese or the other. Klamath Basin has several wildlife viewing areas, refuges, where considerable numbers of waterfowl congregate during the winter.

I believe that the best wintertime use of the Wood River area would be to provide hunting opportunities for basin waterfowlers. I think that minimal access should be provided during the winter.

I believe that summertime access could be somewhat greater with a parking area developed at Wood River Bridge. Wildlife viewing trails could be provided. The majority of the ranch would be left unaltered.

The marsh restoration options are generally good. Referring to the pasture to marsh land can only help move the basin towards a more natural condition.

023

024

Klamath Basin WATER USERS ADVISORY COMMITTEE

8332 Lower Klamath Lake Road
Klamath Falls, OR 97603

U.S. Department of the Interior
Bureau of Land Management
Klamath Falls Resource Area
2795 Anderson Ave., Bldg. 25
Klamath Falls, Or. 97603

Subject: Wood River Property EIS

The Klamath Basin Water Resource Advisory Committee has been involved with the Wood River Project from the start. The committee has been part of the Wood River Wetlands Treat and has had representation from BLM at many of our meetings. The KWRAC after great discussion has passed the following resolution: Resolved that it is the policy of the Klamath Basin Water Resource Advisory Committee to encourage and request that the Bureau of Land Management "maintain the current use of the north half of the 3200 acre Wood River Ranch as predominantly an irrigated pasture for livestock grazing and Canada Goose habitat"

I am further resolved that since the south half of the ranch will be returned to wetlands management, it is in the best interest of the Klamath Basin community and environment to maintain the north half of the ranch in its current management mode. This will help preserve the integrity of cattle grazing as an important economic, social and environmental asset to the Klamath Basin. We will help retain Canada Goose populations at their current high success levels, and will help provide a management and resource control to compare the benefits and impacts of converting the 1600 acre, south half of the ranch.

The committee would like for the BLM to limit the EIS to the Wood River Property only, not only in title but also substance. This is important, because the Wood River Property is a test plot and until the results are in no other property should be considered.

The committee thanks you for the opportunity to address this issue and hope that you consider the information with the greatest of importance.

Thank You
Tracy Linsley
Tracy Linsley, Sec 1



Klamath County - Board of Commissioners

LOCATION: 406 FINE STREET, 2ND FLOOR KLAMATH FALLS, OREGON 97601-0191
MAIL: 403 FINE STREET, SUITE 300 PHOENIX # (503) 883-5100 FAX # (503) 883-5143

June 10, 1994

U. S. Department of the Interior
Bureau of Land Management
Klamath Falls Resource Area
2795 Anderson Avenue, Bldg 25
Klamath Falls, OR 97603

Re: Wood River Property EIS

The Klamath County Board of Commissioners supports the recommendations of the Klamath Basin Water Users Advisory Committee to maintain the current use of the north half of the 3200 acre Wood River Ranch as predominantly an irrigated pasture for livestock grazing and Canada Goose habitat.

We also encourage the Bureau of Land Management to limit the EIS to the Wood River Ranch property until the results of the test plot are evaluated.

Sincerely,

BOARD OF COUNTY COMMISSIONERS

Wes Sims
Wes Sims, Chairman

P. Janet Elmer
P. Janet Elmer, Commissioner

Ed Kenner
Ed Kenner, Commissioner

JUN 15

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2 100
3 120



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11120 Hwy 66
Klamath Falls, OR 97601
June 13, 1994

Barron Ball, Area Manager
Klamath Falls Resource Area
Bureau of Land Management
2795 Anderson Avenue, Bldg 25
Klamath Falls, OR 97603

Comment on Upper Klamath Basin Draft RMP/EIS

As a member of the Wood River Ranch Wetland Team, I am pleased to comment on the RMP/EIS

I endorse Alternative D, the preferred alternative.

Recalling that the objective in the acquisition of the Wood River Ranch by the BLM was to restore it to its historic form and function of a wetland, I believe this alternative comes closest to achieving that objective.

I would like to see the wetland managed so that in the not too distant future both the east side and south side dikes would be opened and a more natural circulation of the waters and mingling with the lake waters could be allowed. Certainly in its original state there was a constant mixing of the waters from the marsh to the lake. As long as the water is only released into the lake by means of pumping, I don't feel it can begin to approximate its original historic condition. I would like to see the maximum amount of water allowed on the lands to allow various depths and various types of marsh. It must be kept in mind that the goal is to improve both water quality and quantity in Klamath Lake.

I am opposed to continued grazing on the north half of the ranch, as is currently being discussed. This is contrary to the objectives of wetland restoration.

I am anxious to see this project proceed as expeditiously as possible. Good luck.

Sincerely,

Betty C. Anderson
Betty C. Anderson

USDI-BLM
Klamath Falls Resource Area
2795 Anderson Ave, Bldg 25
Klamath Falls, Or 97603

6-15-94

Attn: Barron Ball

Re: Upper Klamath Basin Draft-RMP/EIS

Dear Mr. Ball,

After reading the Upper Klamath Basin Draft our organization feels that the best plan for the area in question would be Alternative D (Preferred Alternative).

Please contact our organization if you have any need of further input on this area.

As I am sure you are aware, our National and State organizations are sponsoring a program called "Bring Back the Natives". We would be happy to help you implement this program.

Sincerely yours,

Roger Pratt
Roger Pratt

Douglas Pratt
President-Klamath Basin Chapter-Trout Unlimited
3812 Beverly Dr.
Klamath Falls, Or 97603
H.982-9338/W.984-4147

JUN 15 1 05 PM '94
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JUN 16 1 05 PM '94
BY MAIL

June 17 '94 7:07 1234 KLAMATH TRIBE PLANNING

761.563-763-3426

PAGE 02/02

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027

June 15, 1994

SIERRA CLUB

Klamath Group
P.O. Box 1774
Klamath Falls
OREGON 97601

Mr. Barron Ball, Area Manager
Bureau of Land Management
2795 Anderson Avenue, Bldg 25
Klamath Falls, OR 97603

The Klamath Group of the Sierra Club endorses Alternative D - the Preferred Alternative of the Upper Klamath Basin Draft RMP/EIS. The restoration to marsh of the Wood River Ranch is an important step in the restoration of the health of the Klamath Basin Ecosystem.

While Alternative D lacks detail on implementation, the framework established in the RMP/EIS appears to allow latitude for the BLM to pursue the objectives effectively. We encourage you to plan to pursue marsh conversion of as great a portion of the ranch as is possible.

Until the final details of the Wood River Wetland and exchange are determined, we reserve comment on this. In the, however, remain a matter of considerable interest and concern to our group.

Yours truly,

William M. Hook

William Wood, Secretary/Treasurer

June 17, 1994

Wood River Ranch Project

Klamath Tribes' Cultural and Heritage Specialist response regarding Cultural Resources located on the Wood River Ranch property.

The Klamath Tribes' Culture and Heritage Committee had met previously to discuss the Wood River Ranch project. The cultural resources that may be affected are those of the /kwa'od'kwa' /kwa'od' /portion of the Tribes' ancestors. The village site, located at the mouth of Wood River, has been known throughout Tribal memory. Through Tribal perspective, the Creation legends place the Klamath Tribes in the Klamath Basin area since creation. The village sites are said to have been created for the people by /gmo/kmo/. It is only in relatively recent times that the Tribes have not been able to live in some of the village areas. At this time, Tribal members are still using that area of the Klamath /Agency Lake to gather woods, a water lily whose seeds are rendered down to many different products, which in pre-contact times, were one of the main staples of Klamath subsistence.

The Wood River property is regarded by the Tribes as culturally significant and therefore desires that total management of the area include strong protective measures for the cultural resources in the area. A portion of the property which had been taken out of Tribal ownership until Termination property had not been considered as part of the Klamath Agency program which began in 1984 and probably occurred circa 1961. This portion of properties escaped the "ceded lands" status until it went into private lands ownership. It is within the scope of protection of Klamath Tribes' treaty rights and Federal fiduciary responsibilities to maintain those nonrenewable cultural resources as much as possible for the betterment of the Tribes and general public.

It is therefore recommended that all resources, Tribal members, written documentation, film and photo archives, etc., be removed before ground disturbing activities begin. This is to ensure that no Tribal, Federal, state or local laws be violated. It is also recommended that the design of the project be shared with the Cultural component for review in order to assist in the possible desecration of sacred sites. Finally, the ongoing plans for the Wood River Ranch project be shared on a regular basis while it is being implemented. It is recommended that this statement is to be in complement to other information provided by the Klamath Tribes.

Charles Pratt
Charles Pratt
Cultural and Heritage Specialist

JUN 17 1 05 PM '94



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11120 Hwy 66
Klamath Falls, OR 97601
June 13, 1994

Barron Ball, Area Manager
Klamath Falls Resource Area
Bureau of Land Management
2795 Anderson Avenue, Bldg. 25
Klamath Falls, OR 97603

Re: Comments on Upper Klamath Basin (Wood River Ranch) RMP/EIS

I enthusiastically support Alternative D, the Preferred Alternative.
The plight of the endangered suckers and the generally degraded condition of the water of Klamath Lake point up the necessity of action which will improve sucker and other wildlife habitat, as well as improving the quality and quantity of water in Klamath Lake. Certainly the restoration to marsh of the Wood River Ranch is a significant action to correct these problems. I am proud of the work of the Wood River Wetland Team, of which I am a member.

The key to the success of the restoration to marsh lies in the means chosen. Appendix 7 of the RMP/EIS offers a number of interesting possibilities. As my most recent opportunity to follow the discussions of Eric Diles and others who are developing the stream channel and wetland restoration options, I was very pleased to see them considering plans which would ultimately permit breaching the eastside (Wood River) and south side (Agency Lake) dikes. This would permit lake level operation without the need of pumping, and approximate the historical condition.

Pages 2-17 and 4-21 of the RMP/EIS discuss the socioeconomic impact upon the Klamath Basin economy of withdrawal of this land from cattle grazing. This analysis may have validity as a general argument for irrigated pasture, but is totally inappropriate to the actual operation of the ranch. John Petous, the former owner, specifically contradicted similar economic arguments by citing the actual operation they conducted. He said he and his hired man spent 6 months on the ranch, and purchased groceries and gasoline here during that time. He said that the cattle came from California and went back to California and has no economic influence in this basin. This is the way it actually was, and it shouldn't be ignored in favor of some general or theoretical situation.

I was a member of the Klamath Basin Water Resources Advisory Committee at the time when our recommendation to purchase the Wood River Ranch resulted in its acquisition. I was very pleased with this action. Since then, the same committee, after a considerable change in membership, has voted to recommend that the north half of the ranch be used exclusively for cattle grazing. This action prompted my resignation from the committee. This contradictory action is probably the result of self-centered and selfish interests of a few opportunists who would be pleased to lease BLM lands at \$1.97/ALUM when the current rate is \$1.5/ALUM. Also, the fear of change drives most members of the agricultural community to endorse the status quo, even under circumstances which fail to advance their own interests.

The reasons for the government's authorization of the Wood River Ranch and mandate of the Congress's authorization are clear. The Preferred Alternative must be pursued regardless of the perverse and contradictory recommendations of obstructionists.

Regarding the proposed Wood River Wetland Land Exchange, the specter of an inappropriate exchange has become of concern to me and many others. This could become a major obstacle, depending on the exact provisions of the exchange. Selecting the option of outright purchase could be the best way of achieving the ultimate objective.

Continue to pursue aggressively your promising work on the Preferred Alternative.

Sincerely,

Sherman D. Anderson

APR 17 1994
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Running Y, Inc.

1050 Hwy. 140 West
Klamath Falls, Oregon 97601
503/882-4135

June 17, 1994

030

TO: Cathy Skagney
Bureau of Land Management
2795 Anderson Avenue, Building 25
Klamath Falls, Oregon 97603

FROM: Donald M. Haggland

Subject: Wood River Ranch Draft RMP-EIS

1. Title Regarding the Draft Title, I feel it should refer to the Wood River Plan and not infer it is a plan for the entire Wood River Valley. The team started out with this specific site plan in mind.

A better title might be:
Wood River Ranch R.M.P.

2. Extension of the Plan to other areas.

Additional BLM lands should not be developed or managed under this plan until the results of Resource Management at Wood River Ranch have been scientifically analyzed. The task force was not aware of such an extension at the time the plan was being formulated. The Basin Water Advisory Committee should have input into this area before a final decision is made. The general public is not aware of this expanded management area and should have a chance to develop input.

3. Preferred Option or Plan D.

This plan appears to have become more complex and expensive. I felt it was the Task Force opinion to keep things as simple and inexpensive as possible using existing levees, canals, Road Gates and Drain Pumps to create and manage a wetland and detouring if this improved water quality. Notably certain modifications would have to be made particularly if the Wood River channel was changed to allow it to meander. Savings to the taxpayer was mentioned many times in our meetings.

4. Other Comments on Objections and Effects.

Within the final management plan, I would hope food production would be considered on at least higher parts of the property so it would still be attractive to migratory birds. Grass on the drained areas will bring in the geese both in the fall and spring. Keeping the property under water during all seasons will stop most of the grass production.

Grazing has been mentioned as a source of nutrient load, but by the same token vegetation left to rot also has this effect, and grazing or hay harvest will allow the plant life to grow again and not be smothered out by dead material. In many areas grazing has been found to improve biodiversity.

5. Appendix.

Under Stream Channel Restoration Options (#1), the Wood River meander outside the dike and through the ranch would appear to be the reasonable option.

Under Wetland Restoration Options (#1), (#2), or (#4), would seem to be reasonable and fitting with the discussions.

Respectfully,

Donald M. Haggland
Ranch Manager

DHM:cc

APR 17 1994
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Shawn Anderson
6/17/94



June 16, 1994

A. Barron Ball, Area Manager
Bureau of Land Management
Klamath Falls Resource Area
2795 Anderson Avenue, Building 25
Klamath Falls, OR 97603

Dear Mr. Ball:

The Klamath Basin Water Users Protective Association appreciates the opportunity to provide comments on the March 1994 *Upper Klamath Basin Draft Resource Management Plan/Environmental Impact Statement (Draft EIS or Plan)*. We are particularly grateful that you extended the comment period to June 17, 1994.

We have three primary comments:

- 1) The title of the Draft EIS should better describe the intended area of the EIS, that is the Wood River Ranch. We prefer to call the document *The Wood River Ranch Marsh Restoration Resource Management Plan/Environmental Impact Statement*. By retitling the document as suggested, you would reduce confusion by the public about the intention of the document, provide an important nexus between marsh restoration and historic land use, and retain the cultural history (aesth, ranch culture) of the property.

- 2) Please reference page S-2, paragraph 3:

"If other lands in the upper Klamath Basin were acquired by the BLM or returned to BLM administration, they would be managed consistent with the management objectives described in the Record of Decision for this RMP/EIS."

This paragraph has caused much dissatisfaction with the management Plan by the Water User community. The Draft EIS should be limited to the BLM Wood River property only. We realize that inclusion of other BLM properties in the document would expedite the administrative process, however, this process protected the public from bureaucratic fat. Each property is unique, given spatial and temporal references. The process of developing management plans should respect this uniqueness. The public should be afforded the opportunity to respond to unique proposed property planning documents.

BLM W00026

Promoting Wise Management of Ecosystem Resources

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JUN - 3 1994

COMMENTS ON THE UPPER KLAMATH BASIN DRAFT RESOURCE MANAGEMENT PLAN/ENVIRONMENTAL IMPACT STATEMENT

I think the Petric County boat ramp is in a ideal area. The BLM should not develop a bunch of new boat ramps. Someone thought it was a good idea because the water flows through the Colton boat ramp during the good time of the year. The majority of goose hunters that I have talked to during the 1993/1994 season, would like to keep things primitive. The harder you make hunting access to the property - the higher the quality of hunting will be. Klamath Falls likes good quality public hunting areas. Alternative 3 identifies only one boat ramp near the bridge location - feel this should be added to the preferred alternative except it should be a primitive boat ramp (used only by small boats or canoes that can be carried on top of a vehicle). This would save money on not developing a large parking area suitable for trailers (there would be a saving on not developing the two primitive boat ramps plus parking area and higher standard of road to travel to them. The cost for rock will be estimated at end. On page S-22 under recreation, it says that temporary facilities, such as parking areas, boat ramps, and toilets may be developed prior to development of the recreation plan. I would be real careful doing major improvements prior to the channelling of the property. I feel the BLM could be placing these in the wrong locations.

I think development of a parking area should be analyzed on the other side modoc port highway (parking for vehicles during the fall early winter season). At one of the Wood River Wetland Team "meetings Ralph Oop discussed not to overly develop the property and then turn around and throw people off because of property damage. I'll have to agree with Ralph, once you set regulations its hard to go backwards.

Another option not looked at would be a "king trail" from the intersection of the south and east dikes to a observation tower. This would cost the BLM less money in not having to improve the east dike road to such a high standard.

I don't think bog fires were discussed in any detail. There has been fire started by vehicle exhaust. Prescribed burning on this property can be extremely difficult due to fire wanting to go downwards.

From	To	Cubic Yards	Cost
Modoc PT Highway	intersect east/south dikes	2000 cu.yds	\$3,000
intersect east/south dikes	severnille dike road	6000 cu.yds.	\$90,000
intersect east/south dikes	to observation tower	1600 cu.yds.	\$8,400

Brian McCarty
Brian McCarty

Furthermore, this issue was previously discussed at a fall meeting of the Wood River Wetland Team (WRWT). Unless expanded in a subsequent WRWT meeting, it was agreed by the WRWT to confine the Plan to the Wood River Ranch property. The logic of this decision holds true regardless: overruling the Draft EIS off-site was not the intention of Congress in providing BLM with funding to purchase the ranch, the originating public entity, the Klamath Basin Water Resources Advisory Committee, did not request the funding from Congress to purchase the property to have the project expanded beyond the Wood River property, other agencies and management planning activities within the Klamath ecosystem may conflict with the BLM management plan, management concepts applied on the Wood River Ranch might not be applicable (or acceptable) on other properties in the "Upper Klamath Basin" given public opinion and socio-economic, political and environmental constraints. Clearly, many Water Users see the paragraph quoted above as contributing to the findings of mismanet between BLM management planning and the best wishes of the community.

- 3) The Water Users do not believe that the objective of the "Water Resources" section of the preferred Alternative D (3-19) is appropriate. The document states the objective to be: "To improve the quality and quantity of water entering Agency Lake." This statement again is beyond the scope of the original intent of the Wood River property purchase agreement as provided by the Klamath Basin Water Resources Advisory Committee and the WRWT consensus (fall 1993 meeting).

The objective of the Plan of Wood River property water resources was to assess the quality of water entering the newly restored marsh, provide natural wetland filtration of Wood River (and, now, Severnille) water as it passes through the marsh, and to assess the water quality and changes in the water quality for the water resource uses the ranch. By doing this, the Wood River project would provide a demonstration study of the effects of reclaimed pasture restoration to marsh on water quality. To say that the objective of the project is to improve the quality of water entering Agency Lake is far too broad and beyond the scope and influence of activities on the Wood River property. The Plan should focus on what is "doable" and measurable within the confines of the property.

Thank you for the opportunity to comment. We look forward to working with the BLM on this and other projects.

Sincerely,

David Zeppon
David Zeppon
Executive Director

BLM W00026

WOOD RIVER RANCH

JUN - 3 1994

These are some of my concerns and suggestions for the Wood River Ranch.

Let's keep it a "NO MOTORIZED VEHICLE" area from Oct. 1-April 1 (the beginning of waterfowl season to the beginning of fishing season, or whenever the fish in wood river are finished spawning.) Why not make it like the Pelegas wildlife protection area south of here, 46? It seems to me that if this area has limited access for half of every year it would definitely benefit the wildlife and drastically reduce the amount of vandalism, garbage/litter, excessive road damage and various other abuses that come with year around and unlimited public access. I also think it would be such easier to gradually ease into letting the public access this area at certain times of the year and ease how everything goes, than it would be to shut access areas down because of too much abuse, such as poaching, vandalism and wildlife harassment in general. What do you think?

I personally observed some (illegal and/or unethical) people on the wood river ranch while goose hunting last year. Three times I saw people (they might have been Native Americans, but twice they hid their poles.) snagging spawning fish out of the wood river around the bridge, when fishing season was closed. I also witnessed people drinking alcohol and shooting at ducks while standing on the bridge (duck season was closed) and when people did drive in through the gate, which at that time had 3 or 6 padlocks on it. Now, with the lock problem taken care of, and the gate kept closed, I doubt very much if any of these people would take the time or energy to "WALK IN". What will happen when this gate is open to the public year around? I think the implications are limitless. I also think it is easier and much cheaper to prevent people than to try to fix them later.

The wood river ranch is a good wetter foul hunting area and if it is kept a "NO MOTORIZED VEHICLE" area, it would be the only one in Klamath county (except for Miller Island). It would be nice for the people who are willing to walk and have a quality hunt, to have a place to go. This area could easily become another "BATE LINE", with people driving over where they are blasting at anything that flies, with absolutely no respect for anyone or anything. I feel that if the wood river ranch is open to motorized vehicles during bird season it will not be worth going to.

Parting notes will be the major problem making this a seasonal "NO MOTORIZED VEHICLE" area. My suggestion is to check on the current land ownership of the area directly across from the gate to the U.S.R. This is where people park these vehicles now and we parked there last year. (I thought this land was previously owned by the BLM but I'm not sure. Observations when the original work was purchased). I'm sure some gravel and a garbage can could be bought in and this area would be an excellent place for a information brochure box to be placed.

To summarize: I think the less motorized vehicle access, the less impacts on the wildlife, their environment and the entire ranch in general, which would make for a higher quality place to visit.

Thank You
Tom J. Jettre

Tom J. Jettre

June 6, 1994
Klamath Falls, Or.
97601

10 June 1994

A. Barron Bull
Klamath Resource Area Manager
Bureau of Land Management
2795 Anderson Ave., Box 25
Klamath Falls, Or. 97601

Bureau of Land Management
2795 Anderson Ave., Box 25
Klamath Falls, Or. 97601
Dear Mr. A. Barron Bull:

Upper Klamath Basin Draft Resource Management Plan
Environmental Impact Statement

Comments

Alternative 'D' should be the preferred alternative.
Let this area return to its natural state by letting nature perform 95% of that activity. Nature will furnish the water, the plants and the animals without our help. As the area is returning to its natural condition we (wanting to help) nature,
As this area is returning to a wetland, consider this area for poisonous plants that may be established by the returning wildlife.

Since this area has been removed from the tax rolls of Klamath County make the annual payments to the County Vector District, so that the taxes do not increase because this area will be converted to a wetland. When this area is completely returned to a wetland (wamp) the cost of vector control should be three times the costs for the present operations.

Very truly yours,
Richard L. Welner
Richard L. Welner

Upper Klamath Basin Draft RMP/EIS
ODFW Comments Page 2

leaving management of spotted frogs, yellow rills and tri-colored blackbirds as management byproducts. We're sure this is the way it can easily be rectified by adding ponded fish and other sensitive, threatened and endangered species to the objective statement. We do not intend the primary objective will leave the Upper Klamath Basin Draft RMP/EIS out of step with Bureau Policy.

LIVESTOCK GRAZING (Summary of Effects, throughout the plan and in particular pgs. 4-20 and 4-21). For some reason livestock grazing is receiving more attention than it is due. The logic we see behind your emphasis on grazing is the Wood River Ranch was a cattle operation, 2) cattle production is one of the primary agricultural products in Klamath County, and 3) grazing is allowed on the bulk of BLM lands (98.7%). As for a viable tool to meet the plan's goals objectives, it's a marginal tool at best. As the plan points out under Alternative B on pg. 4-15 - "Livestock grazing... could have a negative impact since there is no way to limit usage in particular areas." We whole heartedly agree with this statement and encourage BLM to use the other identified techniques for vegetation management in place of livestock grazing. We feel the other techniques are easier to control and provide more reliable results.

Additionally, we were taken aback by the plan's efforts on *Livestock Grazing* discussion on page 4-20 and 4-21. Our concern lies with the plan combined the Wood River Ranch AUMs with the Klamath Falls Resource Area AUMs and then said, "If no grazing use occurred on the Wood River property, this would result in a reduction of up to 25% of the Resource Area's grazing capacity." Why? Oh Why was this information presented in this way? The statement just sits the pot and adds fuel to the Grazing on Public Lands fire. The misconceptions portrayed here are multiple. First this section portrays that cattle grazing at the same levels could continue under BLM ownership. This is untrue. There are too many other resource considerations BLM is required to address by law (pg. 1-5 and 1-6). Secondly the plan compares these AUMs with those on the rest of the Resource Area that have already been reduced to meet the Klamath Resource Area's multiple resource management objectives. Moreover, this area constitutes 14% of the historic wetlands in the Wood River Valley (see pg. 2-3), it is the sole known source of nesting habitat for Wood River Grebes, there are 2) listed species suspended of using this area - three of which are endangered (pg. 2-10, table 2 - purple marsh nests to be added to this list) and the area has been designated as a Critical Biological Environmental Corridor (ACEC). Why weren't these facts given in each alternative in their respective sections as livestock received? A more equitable comparison would have been the loss of these AUMs against all private AUMs in Klamath County, but there again, it would just be adding fuel to the fire. We recommended this whole section be reworked to very adequately display what maximum AUM numbers could occur under governing rules and regulations (pgs. 1-2 and 1-6) along with a thorough discussion on why these numbers will be reduced or eliminated. Obviously, given the emphasis the Bureau has placed on public lands grazing, it is a very important political issue. This importance needs to be thoroughly reflected in the plan's rational for future reduction or elimination. Anything less will very likely result in a see-back to any future wetland restoration efforts within the Klamath Basin.

SOCIO-ECONOMIC (pg. 4-21 and Summary of Effects)
The socio-economic section does not give a true picture of the trade-offs. In a direct factory sense, dollar losses are displayed for the livestock operation, where dollar gains are not displayed for the 1-2 employees necessary to operate the area, the restoration activities that are going to occur in the next 2-4 years, or the \$26,000 that will be spent on monitoring annually (pg. 4-7, 1-8). Additionally, no socio-economic discussion is presented as to how benefits the property will provide the Klamath Basin by working to de-list or keep open species from being listed. No mention is made of the socio-economic importance of the area to the area users in with the county tourism plan. Likewise, the plan is showing a private fiduciary loss

RE: UPPER KLAMATH BASIN DRAFT RESOURCE MANAGEMENT
PLAN ENVIRONMENTAL IMPACT STATEMENT

Dear Barron,

Thank you for the opportunity to comment on the Upper Klamath Basin Draft Resource Management Plan Environmental Impact Statement and to allow Oregon Department of Fish and Wildlife participants on the Wood River Wetland Team. While reviewing Chapter 5, I was impressed by the depth and breadth of those contacted, when I noted your interdisciplinary team is made-up of some excellent specialists, in particular Cathy Humphrey - team leader - who has added additional scope to the plan through her participation on the Estuarine Ecosystem Analysis Team, Ron Hicks - who has a penchant for studying and understanding wildlife, especially special status species, and Lou Whittleaker - who has brought a new dimension to the Klamath Resource Area via his background in botany and his enthusiasm for vegetation ecology. The concerns made and specialists input are well reflected throughout the plan. There are a few sections in the plan we would like to have clarified, expanded, or minimized though. These sections primarily deal with the Objective Statement, Livestock Grazing, Socio-Economic Trade-Offs, and Vegetation Management. Following is my attempt to address our concerns:

OBJECTIVE STATEMENT (pg. 1-8 and throughout the plan)
The primary objectives would be to improve water quality and quantity entering Agency and Upper Klamath lakes; and to restore and enhance wetland habitat, primarily for Lost River and shortnose suckers, waterfowl, and secondary for other species. The goal along with this objective statement will be the driving force behind management of the Wood River Ranch. Trade-offs between managing for water quality, fish and wildlife habitat, recreational opportunities, or other management objectives will be guided by the plan's goal and objective statement. Given this as the case, we recommended the objective statement be expanded to focus only on Lost River and shortnose suckers, but also on spotted frogs - which for all practical purposes are close to being extirpated in Klamath County - and other sensitive, threatened and endangered species (pg. 2-10, 2-11). Our recommendation is in line with BLM's policy regarding sensitive, threatened and endangered species, which, for the most part, is reiterated under the Special Status Species Habitat for all Alternatives in Chapter 3. Just focusing on suckers or waterfowl in the objective statement portions will end up

where due to the way the Bureau organized to conduct the land exchange, the plan is unable to show a comparable private fiduciary gain associated with the land exchange. We recommended this section be expanded to represent the true socio-economic trade-offs the purchase of this area represents. The benefits this parcel can provide the public being in public ownership are much greater than what the parcel provided in private ownership. We recommend these benefits be presented as completely and accurately as possible. A start would be to use Oregon's Wetland Methodology, which is a basic system of assessing wildlife habitat, fish habitat, water quality, hydrological control of ripotonal and recreation values associated with the wetland (See attached flyer).¹

Reading through the plan, noted where there are proposals to restore the meander to the Wood River and Seven Mile Creek, to create shallow and deep water wetlands, and to restore native vegetation on a water quality silt and a habitat for fish and wildlife (pg. 4-13 and 4-14). This is fine and good, but what I found difficult was trying to understand how you were going to restore the river and creek meander or create deep and shallow wetlands when the area's elevation drop is only two feet (S2 and other places detailed through the plan - 4,138 to 4,140). We recommended the production of a one page detailed drawing of such restoration proposal as described in Appendix 7. This would enable those of us who are not familiar with the property an understanding of what the Wood River Wetland Team is visualizing. Without detailed drawings or more complete written descriptions, we are only left with a belief that the Wood River Wetland Team is making the best recommendations available; a poor scenario for an EIS. Since the proposed restoration options are the most of this EIS, we feel some form of clarification needs to be added.

Upper Klamath Basin Draft RMP/EIS
ODFW Comment Page 3

Additionally, vegetation management needs to actively manage for spotted frogs, yellow rills, tri-colored blackbirds, and all the other listed sensitive, threatened and endangered species (pg. 2-10, Table 2) instead of precluding their management as by-products of other expressed management objectives (i.e., water quality, suckers and waterfowl habitat). Following are our specific recommendations:

VEGETATION MANAGEMENT
S2-1, Introduction, second paragraph: What is the lake's elevation? This information will give us some idea as to how the wetland will flow and function.
Page 1-8, Long-Term Management Goals and Objectives: Include spotted frogs and other sensitive, threatened and endangered species in the primary objectives statement and in the last paragraph left column "Coordinate multi-agency research."
Page 2-9, Pasture, last paragraph: Produce a more complete list of vegetative species expected to occur with wetland restoration. This will help to emphasize the diversity and values associated with riparian, prairie, and to a lesser extent lacustrine wetlands that are associated with the acquired property.
Page 2-10, Table 2: Purple Martin should be added to this list. In the long-term with riparian restoration, onset of tree bolts decay and cavity excavation, purple martins could recolonize this area. In the short-term, purple martins might be enticed to this area by the construction and erection of artificial purple martin structures.

SPECIFIC RECOMMENDATIONS

S2-1, Introduction, second paragraph: What is the lake's elevation? This information will give us some idea as to how the wetland will flow and function.
Page 1-8, Long-Term Management Goals and Objectives: Include spotted frogs and other sensitive, threatened and endangered species in the primary objectives statement and in the last paragraph left column "Coordinate multi-agency research."
Page 2-9, Pasture, last paragraph: Produce a more complete list of vegetative species expected to occur with wetland restoration. This will help to emphasize the diversity and values associated with riparian, prairie, and to a lesser extent lacustrine wetlands that are associated with the acquired property.
Page 2-10, Table 2: Purple Martin should be added to this list. In the long-term with riparian restoration, onset of tree bolts decay and cavity excavation, purple martins could recolonize this area. In the short-term, purple martins might be enticed to this area by the construction and erection of artificial purple martin structures.

1. B.H. Smith, et al. 12/19/93. Oregon Freshwater Wetland Assessment Methodology. Ed. by S.G. McConnell. Oregon Division of State Lands, Salem, OR.

Chapter 3, Special Status Species Habitat, All Alternatives: Shouldn't the section in parentheses in all of the alternatives include state sensitive species since BLM's policy is to "CARRY OUT MANAGEMENT FOR THE CONSERVATION OF STATE LISTED PLANTS AND ANIMALS." (e.g., pp. 2-3, Special Status Species Habitat, first sentence: "If any special status species (federal or state listed as threatened or endangered, federally proposed as threatened or endangered, category 1 and 2 federal candidate, state and bureau sensitive) are suspected in an area proposal for a management activity, field surveys would focus on those species.")

Page 3-11, Fish and Wildlife Habitat, first paragraph, last sentence: "...livestock grazing... could be used to create diversity and edge effect within the wetlands." BLM needs to be careful they aren't trading off an uncommon habitat in the Wood River Valley for a common one by using cattle to create diversity and edge effect (e.g., using cattle to create short green grass for migrating geese forage which occurs basinwide, instead of allowing the vegetation to become tall and rank, an uncommon vegetative condition in the Wood River Valley, for duck nesting, song birds, small mammals and herptiles).

Page 3-10, Alternative D, Objective, top right hand column: add "...federally listed suckers, spotted frogs, other listed species and/or waterfowl..."

Page 3-21, Special Status Species Habitat, Objective: add "...federally or state listed or..."

Page 3-21, Fish and Wildlife Habitat, Objective: This needs to be expanded to address spotted frogs and other listed species.

Page 3-22, second paragraph: add "Nesting islands and/or upland grass could be developed for waterfowl returners who prefer tall rank vegetation." We wouldn't want to see developments that would increase goose damage problems by creating nesting habitat for more geese or creating nesting conditions for gulls who might predate spotted frogs.

Page 3-25, Livestock Grazing, second to last sentence: Why would the allotment be categorized as an "M" allotment when, for the most, the bulk of the area will be undergoing some very major vegetation transformations in addition to the potential of having 23 listed species on the area. Wouldn't this be categorized an "I" allotment where major investments and modifications need to occur to the grazing program in order to meet the area's goal and objectives?

Page 4-6, Wetland Restoration, last sentence: This is confusing, please clarify. We understand that a palustrine system, that is being restored, takes 5-10 years for the vegetation to become established before the system is fully functioning (sewage treatment through wetland creation in Tualatin, OR, and Arcata, CA).

Page 4-10, second paragraph, Planting: Why is the plan assuming that exotic plant species will be planted to provide additional forage for domestic livestock? Please clarify how this management prescription will help meet the area's identified goal or objectives, or will be innocuous to this end.

Page 4-13, Assumptions, first paragraph: We feel wetland restoration along with riparian vegetation restoration for spotted frogs, yellow rills, neotrops and other wildlife would increase the most.

Page 4-14, Alternative B, second paragraph: Some interconnected deep water pockets scattered throughout the shallow restored wetlands (those less than three feet in depth) are needed to provide escape habitat for muskrats during winter months. As several of

your resource staff are aware, muskrats are the premier animal for keeping shallow wetlands in a hemi-marsh (50% open water; 50% vegetated) condition. A hemi-marsh is desirable for water quality attributes and wildlife and vegetation diversity.

Page 4-14, last paragraph, right hand column: We feel the Bureau could remove the fence wire and leave the ponds, thereby eliminating wildlife fences and yet retain perching sites.

Page 4-15, second paragraph, last sentence: What is the recommended fire regimen and is this based upon a natural regime of human induced (e.g., Native Americans)?

Page App-7, Monitoring BMPs for Soils, Water Resources and Riparian: Where in BLM's organizational structure are the recommended BMPs housed? Are these BMPs current? Were the BMPs peer reviewed?

Page App-11, Wildlife Habitat, Monitoring Questions: How about monitoring sensitive, threatened and endangered species and projects to enhance or maintain these species? How about the development of a self-service check list where visitors monitor observed wildlife, in particular sensitive, threatened or endangered species (e.g., a self card that asks for date, start/end time, # in party, experience, observations). Also, you might want to reference the Oregon Wetland Methodology for evaluation of existing monitoring questions or development of additional monitoring questions.

Page App-19, Natural Processes and Systems, first paragraph: Needs to be amended to address spotted frogs and other listed species.

Page App-25, Introduction, second paragraph, second sentence: should add "...at least periodically saturated with or covered by water during part of the active growing season." This statement should be consistent with BCP's wetland definition.

Overall, through your team's efforts to contact others and the team's diverse background and interest, we feel they put together a sound plan that with some tweaking can be made into an exceptional plan. It's this exceptional category we would like to see as the plan's designation. If the plan is designated exceptional, people will look to it as a reference for future basin wetland restoration projects both on and off public lands. This could greatly facilitate the design and implementation of other basin wetland restoration projects in a timely collaborative manner; an upshot but very real goal of the Wood River Ranch pilot restoration project. Again thank you for the opportunity to comment. I hope our comments have been helpful.

Sincerely,

Glen Ardt
Regional Wildlife Habitat Biologist

cc: Opp/Fortune
Kunze/Dale
Peltzer
name

RESTORATION CHECKLIST

Please use this restoration checklist developed by the National Research Council in preparation of your proposal. Specifically:

1. Has the problem requiring treatment been clearly understood and defined?
2. Is there consensus on the restoration project's purpose?
3. Have project goals and objectives been identified?
4. Has the restoration action been planned with adequate scope and expertise?
5. Does the restoration project design have an annual or midcourse correction point in line with adaptive management procedures?
6. Are the performance indicators—the measurable biological, physical, and chemical attributes—directly and appropriately linked to the objectives?
7. Have adequate management and maintenance programs been developed along with the project, so that costs and operational details are anticipated and monitoring results will be available to serve as input in improving restoration techniques used as the project matures?
8. Has an appropriate reference system (or systems) been selected from which to extract target values of performance indicators for comparison in conducting the project evaluation?
9. Have sufficient baseline data been collected over a suitable period of time on the project ecosystem to facilitate before-and-after treatment comparisons?
10. Have critical project procedures been tested on a small experimental scale in part of the project as to minimize the risks of failure?
11. Has the project been designed to make the restored ecosystem as self-sustaining as possible to minimize maintenance requirements?
12. Has thought been given to how long monitoring will have to be continued before the project can be declared effective?
13. Have risk and uncertainty been adequately considered in project planning?
14. All things considered, is now the right time to begin the project? What do we gain by waiting to implement the project? What do we lose?

NOW AVAILABLE
ORDER FORM ON BACK



June 26, 1994
036

037

Mr. Bail

This brief informal letter is regarding the public comment on the "Upper Klamath Basin Draft Resource Management Plan."

After reading the Management Plan, I would support Alternative D. I realize that this may not be a popular ~~free~~ decision, however in my opinion if something is not done the Wood River will deteriorate to the point where it could not be saved.

Thank you for your attention to this letter

Mike Lygier



Michael Rogers
1887 Van Ness
Ave., San Francisco, CA 94102
415 864-0283



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

REPLY TO
ATTN: WJD-126

JUN 27 1994

A. Barron Bail, Area Manager
Klamath Falls Resource Area
Bureau of Land Management
2795 Anderson Avenue, Building 25
Klamath Falls, Oregon 97603

Re: Upper Klamath Basin Resource Management Plan and
Draft Environmental Impact Statement

Dear Mr. Bail:

The Environmental Protection Agency (EPA) has conducted a review of the Draft Environmental Impact Statement (EIS) for the Upper Klamath Basin Resource Management Plan. Our review was conducted under the National Environmental Policy Act and Section 303 of the Clean Air Act, which directs EPA to review and comment on all federal EISs.

Following our review, EPA has found no significant issues of concern. We will not be providing specific review comments at this time. Therefore, we are rating this draft EIS LO (Lack of Objections). An explanation of the EPA rating system is enclosed for your reference. This rating will be published in the Federal Register.

Thank you for the opportunity to review this draft EIS. If you have any questions regarding our review, please contact Ruth Siquenza at 206/563-2143.

Sincerely,

Ruth Siquenza
Ruth Siquenza, Chief
Environmental Review Section

Enclosure: Rating System Summary

cc: Cathy Humphrey, RMP/EIS Team Leader

Printed on Recycled Paper

RECEIVED JUN 23 1994

038

U.S. Environmental Protection Agency Rating System for
Draft Environmental Impact Statements
Definitions and Rating-by-Action

Environmental Impact of the Action

LO -- Lack of Objections

The Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have discovered opportunities for the application of mitigation measures that could be incorporated with no more than a minor change in the proposal.

IE -- Environmental Concerns

The EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Substantive measures may require substantial changes to the preferred alternative or application of mitigation measures that are not those proposed.

II -- Environmental Impacts

The EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Substantive measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or no alternative). EPA consults in work with the lead agency to reduce these impacts.

III -- Environmental Incompatibility

The EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unacceptably high for the proposed project. Substantive measures may require substantial changes to the proposal to meet with the lead agency to reduce these impacts. If the potential environmental impacts are not reduced to the EIS level, this project will be recommended for refusal in the Council on Environmental Quality (CEQ).

Advisory of the Draft Statement

Category 1 -- Adequate

EPA believes the draft EIS adequately sets forth the environmental impacts of the preferred alternative and those of the alternative reasonably available to the project or action. The further analysis of data collection is necessary, but the concern was not the addition of scientific language or information.

Category 2 -- Deficient Information

The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA review has identified new reasonably available alternatives that are not included in the draft EIS, which should be analyzed in order to fully understand the environmental impacts of the action. The identified additional information, data, analysis or alternatives should be included in the EIS.

Category 3 -- Inadequate

EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA review has identified new, reasonably available alternatives that are not included in the draft EIS, or the draft EIS does not contain sufficient information to fully understand the potentially significant environmental impacts. EPA believes that the identified additional information, data, analysis or alternatives are of such a magnitude that they should have full public review as a draft EIS. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and the draft EIS review, and that should the EIS be finally prepared and made available for public comment, it is recommended to request draft EIS. On the basis of the potential significant impacts involved, this proposal should be a candidate for refusal in the CEQ.

* From EIS Manual: EIS Rating and Procedures for the Series of Federal Actions Transmittal to the Environment, February, 1987.

Barron Bail
BLM - Klamath Falls Resource Area
2795 Anderson Ave Bldg 25
Klamath Falls, OR 97603

June 18, 1994

Dear Mr. Bail,

I am writing to comment on the Wood River DEIS. Before being replaced last winter, I represented the environmental community on the Klamath Basin Water Resources Advisory Committee. The composition of that committee is now heavily weighted in favor of agricultural interests. I therefore recommend that you discount their recent advisory vote in favor of grazing on the north half of the ranch. The committee is no longer representative of the community at large. Marsh restoration is a controversial subject for basin farmers because many of them farm former wetlands, and harbor a deep-seated paranoia that they will be forced off their land by the federal government at some future time. I firmly believe that this perception, rather than any specific objection to Wood River Ranch, colors and clouds their judgment with respect to the DEIS. In fact, more than one agricultural member explained their support for the grazing resolution as a means of protesting BLM management in general. I therefore urge you most strongly to manage the entire Wood River Ranch for the intended purposes of water quality improvement and endangered species protection through wetland restoration.

With regards to the DEIS:

1. I think you should discuss specifically the 1200 acre parcel on the west side of the valley which is presently managed by Bureau of Reclamation.
2. I understand you are planning to change the document title, and delete references to its applicability to unknown future lands to be acquired, as is proper.
3. I am disappointed that in all this time, no more specific, detailed proposals have been advanced. The alternatives are difficult to compare because they have numerous indefinite "options" in common.
4. With regards to recreation, I favor less intensive use, as proposed under Alternative D. I recommend that one half of the property be closed to hunting to provide a sanctuary area, as is the USFW custom for proper management. I favor a minimum of road development.

For the future of the ecological integrity of the Klamath Basin, it is crucial that this initial project succeed. Given our uncertainty as to the degree of water quality improvement we can

22 June 1994

expect from a return to natural marsh conditions, I recommend that the north half of the property be considered for more intensive filtering projects. Return 7-mile and Wood River to their desired historic channels on the south half. On the north half, which has no gradient, try some pumping past interlocking dams, or overland flow, or other research - oriented projects. These would hold more interest for Basin farmers, who might be convinced to devote a small portion of their acreage for water purification of their own run-off. Let's find out just what kind of water quality improvement we can create with more intensive management. This would be a combination of Alternatives C and D. If we design an interesting project, funding will follow.

With regards to channel, restoration, I am not too concerned about finding the historic channel. River beds change and meander continuously, and I see no particular advantage to resurrecting the 1940's river bed, for example. Don't spend money surveying just put plenty of meanders in, and let the current take it from there.

It is pretty obvious from reading this document that you desperately need a wetland ecologist on staff, and the sooner you hire one, the sooner the employment can be freed up to work in their areas of expertise. The lack of trained personnel locally is delaying this project unacceptably. Future wetlands acquisition awaits results from this project, which has scarcely begun. Let's get things moving!

I disagree with the statement that no more than 2 jobs will be created by this project, and believe a more thorough analysis is required. I figure this project will create at least 3 jobs worth of work in BLM alone, not including construction and long-term maintenance of recreation facilities and project monitoring.

While we are on the general subject, I am puzzled as to why you felt it advantageous to sell federal lands to pay for the north half when Congress had already appropriated funds. A million dollars is not a tenth of a drop in the bottomless bucket that is the federal budget. I think BLM needs to use its trade lands to block up checkbook areas to make them manageable. You should not give them up unnecessarily. It would have been sufficient to trade lands to offset the property tax change.

I particularly appreciate your emphasis on endangered species like the pond turtle and spotted frog in the preferred alternative. I think it very likely that many declining species share the juvenile sucker's need for emergent vegetation habitat.

Those are my comments for now. Please keep me on your mailing list.

Sandy Juley
Sincerely,
Sandy Juley
711 Wistar Rd
Orinda, CA 94563 (510)254-7471

A. Barron Ball, Area Manager
Klamath Falls Resource Area, BLM
2795 Anderson Ave., Bldg 25
Klamath Falls, OR 97603

Dear Barron,

I am unclear as to what part the recommendations of the Water Resources Advisory Committee pily in BLM decisions regarding the Wood River Ranch, but I am very disturbed by the recent reorganization of the Committee and by its subsequent change of position on use of the north half of the WRR. The stated purpose for the initial acquisition of the WRR by BLM was to return it to wetland order to contribute to improved water quality, water quantity and duration, in the Klamath Basin ecosystem. When we attended the tour of the south half of the WRR which you conducted, we were told that that was in fact the plan for that portion, and in general we approve of the plan.

If BLM now plans to do something different with the north half of the WRR, will you please so inform us. We would strongly oppose the transfer of the land at all with public funds if it is to be continued in grazing use by private ranchers. What possible justification can be made for such a use of tax monies?

Additionally, Barron, we would like to register our very serious concern over the possible sale of publicly-owned late and old growth forest lands to a timber company as a means of paying for the north half of the Ranch. Particularly given the location of these lands, in an area with so little old forest remaining, I am unable to understand how you can justify your public trust in selling them to be cut. The money for purchase of the north half has been appropriated, as I understand it - why should the public destroy one of its valuable assets to reclaim another when there is no need for it? I will appreciate knowing your thinking on this.

Sincerely yours,

Sally Wells
Sally Wells, for
Concerned Friends of the Winema
3333 Hwy 422
Chiloquin, OR 97824

040



September 10, 1993

Cathy Humphrey
Wood River Wetland Team
Bureau of Land Management
Klamath Falls Resource Area
2795 Anderson Avenue, Bldg. 25
Klamath Falls, Oregon 97603

Dear Ms. Humphrey,

Thank you for continuing to include ONRC on our mailing list for the notes and minutes from the meetings of the Wood River Wetland Team.

ONRC favors an alternative that will establish marshlands on the former Wood River Ranch in a manner that will encourage the re-establishment of native plants and animals, and not the adoption of a plan that might slow or encourage the introduction of exotic, non-native species.

We have noted that all three proposed alternatives (A, B & C) for the Wood River Wetland ES include livestock grazing "as a management tool." We totally support the need for grazing and hold that it would be incompatible with the goals and slow the processes of marsh restoration, and would continue to contribute to the pollution problems which marsh restoration is intended to mitigate.

Congress (and the American Land Conservancy) purchased this livestock ranch for the purpose of marsh restoration. Continuing such grazing would be inconsistent with the reason for which public money was used to acquire these lands. In general, ONRC opposes using Land and Water Conservation Funds for the purpose of continuing commodity based, land exploitation.

Amongst other places, on page 5 under "Existing Conditions--Water Quality" the BLM writes, "Excessive nutrient supply is primarily responsible for the current hyper-nutrient status of the lakes, in summer and fall, nutrient input results in massive blue-green algae blooms." And, "loss of this wetland has also decreased late nutrient cycling and inputs of nutrients to the lake have been altered." You also acknowledge that DEC has shown non-point sources of water pollution to be a "severe problem" in Upper Klamath Lake, it is therefore totally unreasonable to not consider an alternative that would serve to most minimize the introduction of cattle waste into the lake system.

Furthermore, not excluding grazing in any of the alternatives in the BLM's proposed EIS would be illegal as it violates DEC regulations (40 CFR §1502.14) by not consid-

ering a full range of alternatives. [Alternatives shall rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.]

BLM must generate additional alternatives to comply with the DEC regulations. Alternatives should include modifications of Alternatives B and C without the cows. Other grazed areas, outside the Wood River Ranch will easily provide a scientific control in the context of Alternative C's multiple restoration technique approach. These alternatives should also analyze the different impacts on marsh restoration with or without cows. This should include a discussion of how cattle waste would continue nutrient loading. Alternatives including cattle or other livestock need to specifically discuss how cattle grazing serves as a tool to enable or accomplish marsh restoration as you have claimed. How would the alternative without the livestock retard marsh restoration in the absence of this so-called "tool"?

In addition, alternatives must encompass a "reasonable course of action" 40 CFR 1508.25(b) and the National Environmental Policy Act (NEPA) requires federal agencies to consider and analyze all reasonable alternatives to proposed actions. Cows are not native and not necessary to restore area marshes, and in fact will continue to contribute to the non-point source pollution that marsh restoration is intended to mitigate.

The goal of (NEPA) is to ensure "that federal agencies infuse in project planning a thorough consideration of environmental values. . . . The consideration of alternatives requirements furthers that goal by guaranteeing that agency decision makers (have) before them" and take into proper account "all possible alternatives to a particular project which would alter the environmental impact and the cost-benefit balance." *Rob Marshall Alliance v. Hodel*, 61 F.2d 1223 (9th Cir. 1988)

"Implicit in the alternatives requirement is the premise that the options be capable of implementation; evaluation of infeasible alternatives would be a pointless exercise." See *Wagstaff Property Owners v. Schlesinger*, 415 F.Supp. 1296, 597 F.2d 1214 (affirmed), *City of Bonanza v. County of Nevada*, 392 F. Supp 576, *City of August v. Hoge*, 803 F.2d 1020 (9th Cir. 1986), and *CAUSA v. Berglund*, 428 F.Supp 908 (D. Or. 1977).

The BLM should take care to see to the greatest extent possible that non-native exotic species, be they plants or animals are not introduced into the reestablishing marsh ecosystem. ONRC questions whether alternatives that do otherwise are really resource or prudent.

Please share these comments with other members of the planning team.

Sincerely,

Wendell Wood
Wendell Wood
South Central Field Coordinator
PO Box 100
Chiloquin, OR 97624

Paul White, Sr.
Director - District 7

930 Huron Street • Klamath Falls, Oregon 97603
(503) 883-7969

Klamath Basin
WATER USERS ADVISORY COMMITTEE

600 Lower Klamath Lake Road
Klamath Falls, OR 97603 903/796-1661

August 29, 1993

Mr. Barron Ball
Area Manager
Bureau of Land Management
2975 Anderson Avenue, Bldg. 25
Klamath Falls, OR 97603

Re: Wood River Ranch

Dear Mr. Ball:

As you are aware, the Klamath Basin Water Resources Advisory Committee has played a pivotal role in the funding and acquisition of the Wood River Ranch by both American Land Conservancy and BLM. This letter is to formally notify you of our reasons for assisting with this project and the formal group opinion on what the property should be used for.

After months of debate within the committee and with the County Commissioners it was decided, unanimously, that Wood River Ranch should be purchased for the sole purpose of conserving the property in it's entirety to a natural marsh. It is our strong opinion that this is not only the most appropriate use for the property but the reason the effort was initiated by this committee.

We believe that one or two years of interim grazing on a portion of the land is acceptable, but only for that time and only if it does not interfere with the marsh restoration.

We look forward to working with you closely through the Wood River Interagency Team on the project and appreciate this opportunity to clarify our position.

Sincerely,
Richard McIntyre, Project Director
Ron Bohn, Vice Chairman

RECEIVED
BLM - BLM
KLAMATH FALLS, OR
AUG 31 1993

Mr. Ball	Mr. Bohn	Mr. Calkins	Mr. DeWitt	Mr. Egan	Mr. Gorman	Mr. Hines	Mr. Johnson	Mr. Keith	Mr. Lester	Mr. Miller	Mr. Nelson	Mr. Quinn	Mr. Rasmussen	Mr. Smith	Mr. Taylor	Mr. Turner	Mr. Vance	Mr. White	Mr. Williams	Mr. Young
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Near Cathy Humphrey
After completing the
Wood River Wetland Team
fully endorse the
and studies proposed.
soon as possible
as for the
the property

tour on the
on location, I
proposal goals
easy, start as
and get on with it.
recreation use of
I propose the following

1. Limited use from the public, such as 25 duck hunters at a time, separate bird watches from duck hunting as the seasons & dates so the two do not conflict. Duck hunters 4 mos of the year, bird watches 8 mos of year.

"Soup Lips"
Junior Hunter Field Trial Champ

Chairman - Jim Kerns Secretary - Tracy Lacey Project Director - Richard McIntyre
Klamath, Lakey, Marion Counties

043

KLAMATH BASIN WATERFOWL ASSOCIATION
P.O. BOX 1029, TULELAKE, CA. 96134
503 884-9849

February 8, 1993

Barron Ball, Area Manager
U.S. Bureau of Land Management
2795 Anderson Ave. Building 25
Klamath Falls, Oregon 97603

Attention: Gayle Siler

Re: Wood River Ranch
Management

Dear Mr. Ball:

Please consider this letter as additional detail to KBWA's January 12 comments regarding the Wood River Ranch.

Pheasant Hunting

In addition to managing the Ranch for waterfowl production, hunting, fishing, water quality enhancement, sucker enhancement, etc. we recommend that BLM, with the assistance of Oregon Department of Fish and Wildlife, create pheasant habitat and plant the area with Satchwahl or other nearby stocks of wild pheasants for wild pheasant hunting. This effort would hopefully reintroduce wild pheasants not only to the Ranch, but to the whole Wood River Valley.

Barley Production and Cattle Grazing

We recommend that some barley production be included on the ranch and rotated with maren production. The ranch still has an ASCS barley base of about 1,000 acres. Barley would add food production for both waterfowl and pheasants, helping hold waterfowl on the ranch much longer in the winter.

Barley is also needed for "testing" of water quality changes. If the test area is to adequately represent Klamath Basin agriculture, cattle grazing should be included for similar reasons.

Boating Areas for Hunting, Fishing and General Recreation Purposes

1. Interim (to become permanent) rocket boat launching ramps should be located at the southeast corner of the main property to allow launching of boats for boating up Wood River and out into Agency Lake, and out on to the main property if that portion of the property is turned into a deep water marsh.

2. Interim (to become permanent) rocket boat launching ramp should be located at southwest corner of the main property to allow launching of boats for boating up Sawenille Canal and out into Agency Lake, and out on to the main property if that portion of the property is turned into a deep water marsh.

Parking Areas and Vehicular Access for Hunting, Fishing and General Recreation Purposes

1. Rocketed parking areas for year round use should be provided at the above mentioned boat launching ramps for year-round use.
2. A rocketed parking area should be provided at the northeast corner of the property for spring and summer (March through September) use only.
3. A rocketed parking area should be provided along the Wood River levee road at its junction with the "pumps" for year round use. Said "pumps" are located adjacent to the road in the main mid-ranch cross canal.
4. Public vehicular access should be provided year round to the above mentioned boat ramps along the existing rocketed road.
5. Public vehicular access along the existing rocketed road paralleling Wood River should be open as follows, otherwise closed to vehicles:
 - A. Open to public vehicles from March through September to the northeast corner of the property.
 - B. Open to public during pheasant and waterfowl season to the proposed rocketed parking area at the existing "pumps". Said pumps are located adjacent to the road in the main mid-ranch cross canal.

Lease of Remainder of Ranch from American Land Trust

It is our understanding that the American Land Trust will be the owner of the north half of the Wood River Ranch for some period of time, until BLM obtains funds to purchase that part of the Ranch too. We recommend that either BLM or ODFW lease hunting privileges from the American Land Trust on the north half to provide additional public hunting during the final purchase interim. It is a common practice in western states for state wildlife agencies to lease private lands as a means to augment public hunting. Such a lease would also be considered a good will gesture from American Land Trust to the hunters and other recreationalists of the Klamath Basin.

We sincerely appreciate your consideration of these comments and for the opportunity to express them. As your planning process proceeds we would like an opportunity to review your plans periodically and revise and update our comments as appropriate.

Sincerely,

L. Frank Goodson
President

cc: ODFW

January 12, 1993

6 Provide wildlife observational opportunities, compatible with hunting.

Barton Ball, Area Manager
U.S. Bureau of Land Management
2795 Anderson Avenue, Building 25
Klamath Falls, Oregon 97603

Re: Wood River Ranch
Management

Dear Mr. Ball:

Thank you for giving the public an opportunity to express its thoughts regarding BLM's future management of the Wood River Ranch. I can't remember an earlier occasion when the public has a chance to comment on management of a property even before the acquisition was completed. You are to be commended for providing such early public involvement.

As you know the Wood River Ranch, as presently managed, is one of the best Canada waterfowl hunting properties in the United States. The Wood River itself is also an excellent trout fishery. Comments here by the Klamath Basin Waterfowl Association are mostly concerned with hunting though we intuitively support fishing and other management objectives, too. Our comments might be more meaningful if you knew a little more of our organization and where we are coming from.

The Klamath Basin Waterfowl Association (KBWA) is a non-profit waterfowl conservation and hunting organization recently formed in Oregon and California to protect, grow and enhance waterfowl and waterfowl hunting in the Upper Klamath Basin. The organization's membership is over 1700 and is composed of a coalition signed by over 2,500 Oregon and California residents who have indicated a strong interest and concern in the well being of waterfowl conservation and sports hunting in the Basin.

KBWA recommends, as a minimum, that BLM manage Wood River Ranch as:

1. Maintain and enhance present waterfowl and upland game populations.
2. Develop and maintain public waterfowl and upland game hunting on all portions of the Ranch except for reasonable take-downs for safety purposes. This means 95% to 98% of the valley areas of the Ranch should be opened to hunting, in season, as with similar areas managed by Oregon Department of Fish and Wildlife, and California Department of Fish and Game.
3. Enhance production and survival of endangered sucker fish, to the extent practicable.
4. Enhance water quality of Agency and Upper Klamath Lakes, to the extent practicable.
5. Maintain and enhance the Wood River and Klamath/John Lake trout fisheries.

As you are probably aware, KBWA has not objected to purchase of the Wood River Ranch by BLM, but has objected on several occasions to the Ranch's possible acquisition by the U.S. Fish and Wildlife Service (FWS). KBWA's main concerns with the Fish and Wildlife Service owning more lands in Upper Klamath Basin is that, by tradition, FWS leases 65% of its newly-acquired lands to hunting. As experienced at Lower Klamath National Wildlife Refuge, too many closed zones result in overcrowding in those areas, which in turn causes the hunting to be poorer on the remaining refuge lands and on the surrounding private lands, too.

Oregon Department of Fish and Wildlife, California Department of Fish and Game, the Forest Service and BLM, on the other hand, normally keep all lands open to hunting except for minor take-downs for safety purposes. This is the management approach that KBWA supports.

Dear to pass up the chance to 11,000,000 Wood River duck/bird and members of your staff, and members of Congressman Adam's staff, advise them of our Association that if the ranch were acquired, BLM would apply to seasonal hunting policies toward its management. These all areas of the ranch would be open to hunting except for minor take-downs for safety purposes. We trust that you will.

We sincerely appreciate your consideration of these comments and for the opportunity to express them.

Sincerely,
Original signed by
L Frank Ghossein
President

cc: Congressman Bob Smith
Congressman Wally Harger
Klamath County Commissioners
Oregon Department of Fish & Wildlife
California Department of Fish & Game
U.S. Fish and Wildlife Service

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**KLAMATH BASIN WATER USERS
PROTECTIVE ASSOCIATION**
Promoting Wise Management of Ecosystem Resources

September 17, 1993

Cathy Humphrey
U.S. Bureau of Land Management
2795 Anderson Avenue, Building 25
Klamath Falls, OR 97603

Dear Ms. Humphrey:

The Klamath Basin Water Users Protective Association (KBWUPA) appreciates the opportunity to comment on the "Existing Conditions" section of the Wood River Wetland Environmental Impact Statement (EIS) and on the "Long Range Goals" of the Wood River Wetlands Team for the property. You will find our comments below:

EXISTING CONDITIONS

General comment: The KBWUPA feels the draft "Existing Conditions" section you present, generally, is a fair description of the project area; however, we caution that many of the statements related to the influence of agriculture on the existing condition and expected disposition of the property have not been proved. It is in this regard that the restoration and design of projects on the Wood River Ranch are of such great importance. The KBWUPA would like to utilize lessons learned from this wetlands restoration activity to guide future water quality enhancement efforts in the Klamath basin.

Page 2, paragraph 2: Agricultural use has occurred for more than 100 years in the region, dating back to at least the Swamp Act and probably to 1860.

Page 4, paragraph 1: Chemicals "such as fertilizers and herbicides" are generally not used in this region, thus are not a prime contributor to poor water quality.

The use of the words "fair" and "poor" are relative terms, what is the standard? It has been documented that the "natural" lake water quality at the turn of the century was poor.

Is it nutrient-rich "irrigation return" water or nutrient-rich surface water? We suggest irrigation return water should not be the culprit without definitive proof.

Page 4, paragraph 4: Clarification needs to be made with respect to the water rights of the property. We assume the water rights of the Wood River Ranch will be disposed of as stated in the "Wetland Tenure" section, page 3 since the Meadows Drainage holds these rights for agriculture. It is recommended that a separate paragraph be written addressing water rights.

Page 5, paragraph 1: If the Wood River Ranch has water rights, in a drought year, when water isn't available in adequate quantities, the Wood River Ranch would probably have an effect on uses by other District members.

Page 5, paragraph 2: In the last sentence, we recommend changing the word "concentration" to "proportion". This word better describes the situation.

Page 8, paragraph 3: Croplands do retain nutrients, and if livestock are grazed on the property, some of those nutrients are removed when the livestock are removed. In some instances, croplands actually improve water quality; Dr. Davis in the Wetlands EIS is suggesting this method to remove nutrients from the Tulelake swamp.

Page 5 & 6, paragraph 3 and 1 respectively: Wetlands may have improved the capacity of the lake but it is unclear if storage was "improved" since transpiration of wetland flora is much greater than cropland or pasture lands. A study on the net effect on available water should be included in the project. We may increase lake capacity and storage but have a net loss of water due to transpiration of wetland plants.

We recommend that a sub-heading be added to this section which deals with water storage and the net effects of wetlands restoration to available surface water/ground water. Possibly on page 16, after the third paragraph.

Page 8, paragraph 2: "Massive blooms of algae" may occur. What does the word "massive" mean--large enough to cause pH in excess of 11 and fish kills?

Page 8, paragraph 3: We earnestly question the conclusion of the USFWS 1992 report since there are only two, small drainage ditches emptying into the lake near Buck Island. It would be best to delete the entire sentence "This was believed... nearby ranches (USFWS 1992)".

Page 7 & 8, Table: We have not had the opportunity to review the DRG study in detail but doubt the use of pesticides is a severe problem (at least attributable to agriculture) since crops are generally not grown above the lake where there is drainage flow into the lake. Most of this land is utilized for cattle grazing and, thus, pesticides are not used.

Page 9, paragraph 4: The KBWPA is solidly in favor of improving water quality and quantity; however, it must be emphasized that restoration of marshlands may degrade water quality and that studies should be objective in this regard.

Page 11, paragraph 3: In the third line starting "Marsh" the verb "will" probably should be replaced by "has been"?

Page 11, paragraph 4: Kirk-Cook soils are better suited to sprinkler irrigation of high value crops due to the cost of running a sprinkler system. A sprinkler system on a low value crop would jeopardize the feasibility of the crop.

Page 14, paragraph 3: Noxal grass is found on the Wood River Ranch and could become a major problem (in terms of propagating the weed) if adequate controls are not put in place, (i.e. herbicide use, grazing or flood control).

Page 17, paragraph 1: How much water does a wetland community consume?

Page 18, paragraph 1: Will the conversion of grasslands to wetlands result in the loss of native grassland species? Should this be avoided? Will the grassland habitat suffer irreparable harm?

Page 18, paragraph 3: The term "refugia" should be clearly defined since there are a number of definitions given the fish species and growth stage of the species.

Page 22, paragraph 3: We recommend equivalent "value" is more equitable than "acreage" for land disposition to offset local tax revenue loss.

Page 22, comment: The potential for other commercial uses and influences of the property should be mentioned, i.e. resort property development in neighboring lands (increased use and sewage treatment problems) and potential for aquaculture (rainbow trout, crawfish, wocus and algae collection for profit?).

LONG-TERM GOALS

We suggest that the long-term goals should be prioritized to eliminate resource conflicts. For example, it is not known whether restoration of the reclaimed Wood River Ranch will improve water quality; therefore, the goal of improved water quality and wetland property development in neighboring lands (increased use and sewage treatment problems) and potential for aquaculture (rainbow trout, crawfish, wocus and algae collection for profit?).

The second priority should be to study the effects of wetlands restoration on improved water storage. Sucker habitat improvement should be the final goal. All other "goals" should fall under these three top priorities. In fact, all other goals should not be considered "goals" but, rather, positive externalities (side-effects) of the original goal to study water quality through wetland restoration.

Finally, the Long-term goals should "Provide for public recreation (including hunting and fishing) and environmental education"...and agriculture (when used as a management tool).

Please review our comments at your earliest convenience. If you have any questions, I will be happy to discuss them with you.

Sincerely,

David Seppelt
Executive Director



The Klamath Tribe

P.O. Box 436
Chiloqu, Oregon 97622
Telephone (503) 783-2219

December 16, 1993

A. Barron Ball
RIM Klamath Falls Resource Area
2785 Anderson Ave., Bldg. 25
Klamath Falls, OR 97603

Subject: Wood River Ranch Cultural Resource Management Plan:
Preliminary Comment on Klamath Tribes' Cultural Resources
in the Area of Wood River Property

Dear Mr. Ball:

This is in response to the request of your resource area archaeologist, Bill Telle, as discussed in a meeting between him, Bill Gannon, Dino Herrera (Klamath Tribes' Cultural Resource Site Protection Technician), John Allison (Klamath Tribes' Archaeologist), and Elwood Miller, Jr. (Klamath Tribes' Cultural Resource Coordinator and Natural Resource Specialist). The meeting took place yesterday, and the request was that our input be provided by tomorrow. Of course this allows only preliminary comment, with the understanding that the draft EIS will allow further, more comprehensive input by the Tribes Cultural Resource Program.

Bibliographic References

There are references to the winter villages along the lower Wood River /Kohakaini cove/ and at a spring one quarter mile east of the mouth of the river in all of the sources researched. The main village is called /Kow/oddi/ or Kohakai, and is home village for what is called the Agency Lake Group or Wood River Group of the Klamath Tribe.

- Spier, Leslie, Original Field Notes and maps, 1925-26 and 1935. Bancroft Library, University of California, Berkeley; and 1939, Klamath Ethnography. University of California Publications in American Archaeology and Ethnography, Berkeley. Spier shows /Kow/oddi/ on the sketch map in his field notes directly adjacent to the mouth on the east bank of the Wood River. In 1930, page 16, referring to figure 3: "At Kohakaini is close to the mouth of the Wood River. The site is a quarter mile long. The informant stated (that) it contained 20 houses, another two earth lodges (one a shaman's), not incompatible statements. A spring here permits

fish to remain all winter. A few houses are at another spring a quarter mile east. This is the only member cited of the Agency Lake Group (Kow'oddiin)."

- Curtis, Edward S., 1924, *The North American Indian*, vol. 13. Curtis refers to 6 bands of Klamath. One of these is "The Tuhkak-in along the Wood River in the region called Tuhkak." (p. 238).
- Stern, Theodore, Original Field Notes and Maps, 1932-36, University Archives, University of Oregon, Eugene. In notes accompanying the map of site locations, citing "Gatschet manuscript material, p. 516" (Gatschet, Albert S., 1890, *The Klamath Indians of Southwestern Oregon*, Contributions to North American Ethnology, Vol. 2, 2 Vols. US Geographic Survey of the Rocky Mountain Region), he refers to Kihakaini Kog - Wood River, "it runs to its mouth on west side at Kohakai". (See Stern's map excerpt, attached).

Traditional History

It is known among tribal members that there were village sites and scattered clusters of houses all along the Wood River. These are permanent houses of families that utilized the Wood River Valley, surrounding mountains, and Agency Lake in their seasonal round. Thus it served as the central area for many economic, spiritual, and social activities. Some such areas would be discernible through archaeological methods, others would not.

The specific area of the Wood River Ranch BLM property is the most important wocus gathering area on the east side of Agency Lake. It is also a hunting area for many species of water fowl, a fishing area, a place where duck and goose eggs are gathered, and an area for collecting the roots and plant fibers of such plants as tulip and oastail.

Archaeological Evidence

Dino Herrera, responding to a call regarding a sighting of persons violating this site with shovels and archaeological screens, observed a large disturbed area with dense lithic deposits at the mouth of the Wood River.

We provide this to the Draft EIS with the understanding that this is a preliminary input. If you need further assistance, please feel free to contact me, Dino Herrera or John Allison.

Yours truly,

Elwood Miller, Jr.
Elwood Miller, Jr.
Cultural Resources Coordinator
BIM/Ja

RECEIVED
BUREAU OF LAND MANAGEMENT
DEC 17 1993

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Copy to BLM

Mr. A. WADSWORTH BAIL
HEAD OF LAND MANAGEMENT
ALABAMA FALLS, OR. 97603

DEAR MR. BAIL,

B.L.W. has really created a monster by having a gate on Nodas Point Road, forcing people to walk the Dyke to hunting on the flood river wetlands. About 4:00 A.M. the hunters start to park in front of the gate. Hunters start blasting car doors, dogs barking, etc. lots of noise. They park in front of our mailbox. Block the ranch gate so ranchers can not get big cattle trucks in, they drive down in the ditches bending the culverts. With this congestion snow removal is difficult. Many have come to our door asking if they can park in our parking lot, and when I turn them down they get belligerent. They pull canoes on the snow and ferry back packs with their decoys. It's not only a pain for the neighbors, but if you are going to allow hunting it's not fair to the hunters. If the gate was moved to the big flat on the west side of the Wood River, I am sure it would solve the problem.

Since the gate is locked most of the time the Fish and Game does not monitor the hunters. We have seen over limits of waterfowl brought out, and have seen spawning cranes brought out in Nov. & Dec. so large their tails drag in the snow. Also over the limit in numbers. As you know one hunter was so mad at having to walk out that he sprayed half of your beautiful sign with black paint and the next day he brought another can and finished the job. You have no idea of the shouting and language when they drive up to the locked gate.

One of the cowboys told me that he almost got run over by a car whose driver was looking at all the parked vehicles. He had to perk in road to open the gate and when crossing back to his truck the driver almost hit him. All those stook trucks having to stop in the road while they open the gate is a real aggravation to them and to us.

Lots of shooting goes on after dusk, when it is not legal. I was taking a walk in early Nov., two families were fishing north of the Wood River bridge. I told them that area was closed and they told me to mind my own business. Law enforcement officers used to patrol the Dyke road to the Wood River and that kept most people honest.

The way hunters and fishermen don't care where or how they park on a busy lake frontage road I am surprised someone has not been killed. I can't understand why B.L.W. has let this problem go so long.

Sincerely,

Carroll S. Thomas
Carroll S. Thomas

RECEIVED
MAY 20 1995

cc Oregon Fish & Wildlife

6 January 1995

Wedge Watkins
Klamath Resource Area, BLM
2795 Anderson Ave., Bldg. 25
Klamath Falls, OR. 97603



Central Region Office

RE: Wood River Ranch

Dear Wedge,

I want to tell you how very pleased I am to have read in the Wood River minutes (7 Dec.) that you were selected as the Wood River Ranch Coordinator. With the resource people you have around you (Ron Hicks, Lew Whitaker, Gayle Siller...) and your capabilities, I envision the development of an exceptional plan that will be the Wetland Restoration Bible for other restoration efforts within the Klamath Basin (i.e., Rummung Y).

Please include me on the Wood River Ranch team. I'll participate as time allows. I have a real interest in wetland restoration efforts in the Klamath Basin including socio-economic considerations. Unless we work through a Rancher or Farmer's eye, we won't restore many wetlands in the basin.

Now that you are on board as the project manager, I would like to resubmit our comments regarding the Draft Mgt. Plan for the Wood River Ranch (Draft - Upper Klamath Basin Resource Management Plan & EIS). Since I didn't hear back from BLM regarding our comments, and just learned that little has been done since last spring, I got to wondering if our comments were ever received or if they were lost in the shuffle. If you've already reviewed them, then no harm. If you haven't seen them, then I hope they help. If you need any clarification or expansion of thoughts or ideas, please give me a call.

Again, Congratulations and we'll be talking.

Glenn Ardt

Glenn Ardt



BLM Permit Road
Wood, OR 97672
DCB 760-0463
FAX: 503-388-4381



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
OREGON OPERATIONAL OFFICE
811 S.W. 6th Avenue
Portland, Oregon 97204

April 12, 1995

Mr. Wedge Watkins
U.S. Department of the Interior
Bureau of Land Management
Klamath Falls Resource Area
2795 Anderson Ave., Bldg. 25
Klamath Falls, OR 97603

RE: Wood River Wetland Plan

Dear Wedge:

I have reviewed the latest version of Appendix 3 (Wood River Wetland Plan Monitoring), and Alternative D (The Preferred Alternative) and offer the following comments and recommendations for your consideration.

Overall, I believe these documents accurately reflect the project design options we discussed during my visit to Klamath Falls on March 6 and 7, 1995. I am particularly pleased to see the "riparian widening scenario" included in the text and a great deal of environmental benefit would result from abandoning the need to maintain access channels to the existing county boat ramp by establishing a new, elevated boat launch facility closer to the Wood River Bridge. If its a matter of ownership, why not let the county manage the new boat ramp facility? Not only would the environmental disturbance from the dredge and disposal activities be eliminated but the cost of channel maintenance would also be saved. The remainder of my comments address the monitoring plan.

1. Page App-11 under Vegetation - Standards/Methods; I recommend establishing photo points for the vegetation sampling areas similar to what is being proposed for the riparian monitoring process.
2. Page App-12 under Riparian Areas - Monitoring Questions; assuming the channel dredging will cease or be greatly curtailed within the Wood River floodway, a monitoring question or two should be directed at addressing channel recovery after dredging has ceased.

3. Page App-12 under Riparian Areas - Standards/Methods; I presume the discussion on vegetation monitoring includes collecting baseline data. This is not clear in the document. Also, where might I get a copy of the Riparian Area Management: Stream/Riparian/Wetland Monitoring TR 1377-9 USDI - BLM?
4. Page App-13 under Wildlife Habitat - Monitoring Questions; the enhanced riparian corridors also need to be assessed along with the shrub and tree clumps planted on the dikes for the quantity and quality of habitat necessary for neotropical migrant birds. In other words, the riparian areas provide important habitat for many neotropical migrant/nesting species, and thus, need to be assessed along with the dike habitat improvements.
5. Page App-13 under Wildlife Habitat - Monitoring Questions; reference should be made for nesting structures (e.g., nesting boxes for swallows, bats, woodpeckers, etc.) within the riparian area in addition to those placed for raptors and waterfowl.
6. Page App-14 under Wildlife Habitat - Standards/Methods; I believe amphibian monitoring should be done on 3/5 year intervals. Might also want to include turtle monitoring.
7. Page App-14 under Fish Habitat - Monitoring Questions; if channel dredging within the Wood River floodway is to continue then some type of monitoring (e.g., macroinvertebrates, turbidity, fish habitat disruption, etc.) should be initiated to measure the environmental effects on the aquatic ecosystems.
8. Page App-18 under Grazing Management; with the water level management options that will be available for the majority of the site, grazing should not be necessary for vegetation control except, perhaps, in the higher elevation areas at the north end of the property. In the event that grazing is used as a "management tool" it might be an interesting experiment to compare different management scenarios in adjacent plots (e.g., mowing vs. grazing vs. pesticides vs. burning or any combination thereof).

I appreciate this opportunity to review and comment on this important project. If I can be of further assistance or if you need further clarification of these comments please contact me at the above address or call (503) 326-2676.

Sincerely,
Nalph Thomas Rogers
Nalph Thomas Rogers
Ecologist

Up type & Scott - Please remember in recreation parking that your parking are - and with - new users who are not anglers, and few know the use of markers is incompatible with a quality experience. I also liked Reynolds comments last week that the BLM had historically provided more "purview" type recreation by providing - and that we are owed more of a rest for that

Sandy Wells

050

RECEIVED MAY 16 1995

052

Klamath Country Fly Casters

P.O. Box 324 Klamath Falls, Oregon 97601

5/12/95

Mr. Barron A. Ball
Bureau of Land Management
2795 Anderson Avenue
Klamath Falls, Or 97601

Dear Mr. Ball,

It has come to our attention that the BLM is planning access improvements on the Wood River near Modoc Point Road. Our understanding is that thought is being given to the development of parking facilities and that you are also contemplating a new boat access ramp in the Wood River Ranch area.

This information was presented to our club at a recent meeting and a lively discussion ensued. I was asked to present you with input from our group relative to the development of the Wood River Ranch area. It is our understanding that you are looking for feedback from the public at this time. We offer these thoughts for your consideration.

We believe that the expansion of parking near Modoc Point Road would be acceptable since parking is limited at this time. We would prefer that access to the river be limited to walk-in traffic from the parking facility. We are opposed to the installation of a new boat ramp for several reasons. First of all this is one of our areas premier wild fisheries and we would like to see it stay that way. We are concerned about the deleterious effects caused by increased fishing pressure on the Wood River. Secondly boat access is available through Peric Park and we don't feel additional boat access is necessary.

We love to fish and don't want to deny anyone access to the extraordinary fisheries we have in the Klamath Basin. It is obvious to us that in order to insure that these fisheries are available to future generations we must afford them some protection. We are not asking you to limit existing access. We pray you will give long and careful thought to any idea that involves the expansion of access to already available fisheries.

Thank you for taking the time to hear our concerns. If you have any questions please feel free to call me at 503-882-9482 or contact Tim Lancaster our President at 503-883-1475.

Sincerely,


John W. Dutton
Secretary

cc Tim Lancaster

051

4/23/95

Dear Sam,

I enjoyed sitting in on the management meeting, very interesting. I'm in favor of keeping the parking away from the river. I must of made the walk a dozen times this winter and it adds to the enjoyment of the river.

If you are in the St. Klamath area this season drop me and do some fishing.

Christopher Boyd
Box 527, St. Klamath, Or.

RECEIVED MAY 17 1995

053



Barron Ball
US Bureau of Land Management
2795 Anderson Ave
Klamath Falls, Or 97603

5-17-95

Re: Fishing Access at Wood River Ranch

Dear Mr. Ball,


Klamath Basin Chapter of Trout Unlimited would like to see fishing access to Wood River at Wood River Ranch limited to a walk-in basis.

We feel that this will effectively lessen the trash and garbage problem at the site. Also we feel that it will promote better conservation, in that it will allow use of the site, yet somewhat limit large numbers of people from overfishing the area.

Since Wood River is a spawning ground for the trout in our lake, we feel that it needs some form of protection from overfishing of the spawning fish.

Walk-in access should help in that regard.

Sincerely yours,


Doug Pratt
President-Klamath Basin Chapter

Appendix B

Wood River Wetland

Plan Monitoring

Introduction

The BLM planning regulations (43 CFR 1610.4-9) call for monitoring and evaluating resource management plans at appropriate intervals. The purposes of monitoring and evaluating the Upper Klamath Basin and Wood River Wetland Resource Management Plan/Environmental Impact Statement (RMP/EIS) are to:

- ◆ Track progress of RMP implementation and assure that activities are occurring in conformance with the plan (implementation monitoring);
- ◆ Determine if activities are producing the expected results and meeting stated objectives (effectiveness monitoring); and
- ◆ Determine if activities are causing the effects identified in the EIS (validation).
- ◆ Insure that research results are well documented and shared with the community.

Implementation of the RMP will be monitored to ensure that management actions are being implemented and are meeting their intended purposes. Specific management actions will be compared with RMP objectives to ensure consistency with the intent of the plan.

Monitoring will be conducted as specified in the following sections, and the results will be reported in an Annual Program Summary, along with monitoring results from the RMP for the rest of the Klamath Falls Resource Area. This annual summary will be published starting the second year following initial implementation of the RMP. The Annual Program Summary will serve as a report to the public, track and assess the progress of plan implementation, and state the findings made through monitoring. For the Upper Klamath Basin portion of the program summary, the BLM will determine if:

- ◆ management actions are resulting in satisfactory progress toward achieving RMP objectives;
- ◆ management actions are consistent with current policy;
- ◆ original assumptions are valid and impacts are within the range predicted, given the reliability of the predictions;
- ◆ mitigation and corrective measures are satisfactory and serving their purposes;
- ◆ the RMP is still consistent with the plans and policies of state or local government, other federal agencies, and the Klamath Tribes;
- ◆ new data are available that could result in alteration or amendment of the plan;
- ◆ requirements of the National Environmental Policy Act are being met; and
- ◆ compliance is being achieved on actions authorized by the BLM.

Appendix B - Wood River Wetland Plan Monitoring

Where relevant, monitoring will follow written standards for sampling design, parameters to be monitored, analytical techniques, statistical methods for data analysis, and reporting units.

Involvement of other interested parties and agencies in the monitoring of plan implementation will be encouraged. Currently the parameters of water chemistry, macroinvertebrates, ground water quality, fish distribution, and waterfowl use are being monitored by other organizations and individuals. The BLM will not duplicate these efforts, but will encourage their continuation and coordinate new efforts with parties able to fund their own participation. The Wood River Wetland Team process will be used to provide feedback for determining monitoring needs and priorities. Limited BLM funding will be used to monitor priority data needs not covered by other parties.

This monitoring plan is not static. During the life of the RMP the monitoring plan itself will be periodically evaluated to ascertain that the monitoring questions and standards remain relevant, and will be fine-tuned as appropriate. Modification of the monitoring plan will not, in itself, trigger a plan amendment or revision. For example, discovery of cultural resources or special status species could require additional monitoring efforts. A section outlining appropriate Best Management Practices is included, for reference, at the end of this appendix.

Air Quality

Expected Future Conditions and Outputs

Compliance with the Oregon Smoke Management Plan and the State Implementation Plan, to help meet established air quality standards in accordance with the Clean Air Act.

Monitoring Questions

- ◆ Are management practices achieving the goal of complying with the Oregon Smoke Management Plan and State Implementation Plan?
- ◆ Are BLM prescribed fires contributing to intrusions into Class I areas? How frequently do intrusions occur?
- ◆ Of intrusions that the BLM is reported to be responsible for, what was the cause and what can be done to minimize future occurrences?

Standards/Methods

- ◆ Using the Oregon Smoke Management Annual Report and any BLM smoke surveillance reports, the number of intrusions BLM certainly or possibly contributed to will be determined annually. The percentage of total units burned that contributed (or might have) to such intrusions will be calculated.
- ◆ Reported intrusions will be individually investigated to determine the most probable cause and establish possible corrective measures.

Costs

An estimated \$500 annually.

Cultural Resources Including American Indian Values

Expected Future Conditions and Outputs

Identification of cultural resource localities for public, scientific, and cultural heritage purposes. Conservation and protection of cultural resource values for future generations. Furnish information on long-term environmental change and past interactions between humans and the environment. Fulfillment of responsibilities to appropriate American Indian tribes regarding heritage and religious concerns.

Monitoring Questions

- ◆ Are cultural resources being addressed in deciding whether or not to go forward with surface disturbing actions? During surface disturbing actions are steps being taken to adequately mitigate disturbances?
- ◆ What efforts are being made to work with American Indian Tribes to accomplish cultural resource objectives?

Standards/Methods

- ◆ Archaeological surveys will be conducted on all areas where earth disturbing activities are scheduled to occur. Whenever any earth disturbing activity is scheduled to occur, the Klamath Tribes will be notified of the activity, preferably 30 days in advance. During all earth disturbing activities a BLM (or contract) archaeologist will be on site to observe and perform random testing of the earth that is disturbed. The Klamath Tribes may, at their own expense, furnish a qualified archaeological technician (GS-102-4/5 or higher) to accompany and assist the BLM archaeologist, or technician assigned to the project. If cultural materials are found during this activity, appropriate mitigation measures will be immediately taken in accordance with the Natural Historic Preservation Act and other laws.
- ◆ Previously disturbed sites that are to be re-disturbed will be subject to random sampling for the presence of cultural resources.

Costs

- ◆ Costs incurred to monitor or mitigate disturbance of cultural resources is dependent on the extent of the earth disturbing activity. The extent of the activity is not known at this time.

Water Resources

Expected Future Conditions and Outputs

Restore the Wood River property to its previous function as a wetland community within the unalterable constraints (such as elevation, existing dikes, water rights, land ownership patterns, and funds). Long-term improvements in water quality entering Agency Lake would be targeted, but short-term localized reductions could occur. Water use will be compatible with Oregon State laws. The Wood River Wetland Team process will be used to review and comment on monitoring and research needs and priorities on an ongoing basis.

Monitoring Questions

- ◆ What is the quality of the water entering Agency Lake from the Wood River property? Is the quality improved, reduced, or the same as the quality of water that was pumped off of the property prior to BLM acquisition?
- ◆ Is water use in compliance with state laws?
- ◆ Are site-specific Best Management Practices incorporated in project design and correctly applied?
- ◆ Are applied Best Management Practices achieving water resource objectives?
- ◆ Are applied Best Management Practices effective in maintaining or improving water quality consistent with basin-specific water quality criteria for protection of recognized beneficial uses?
- ◆ Are objectives for the biological, chemical, and physical functions of the wetland ecosystem being met?

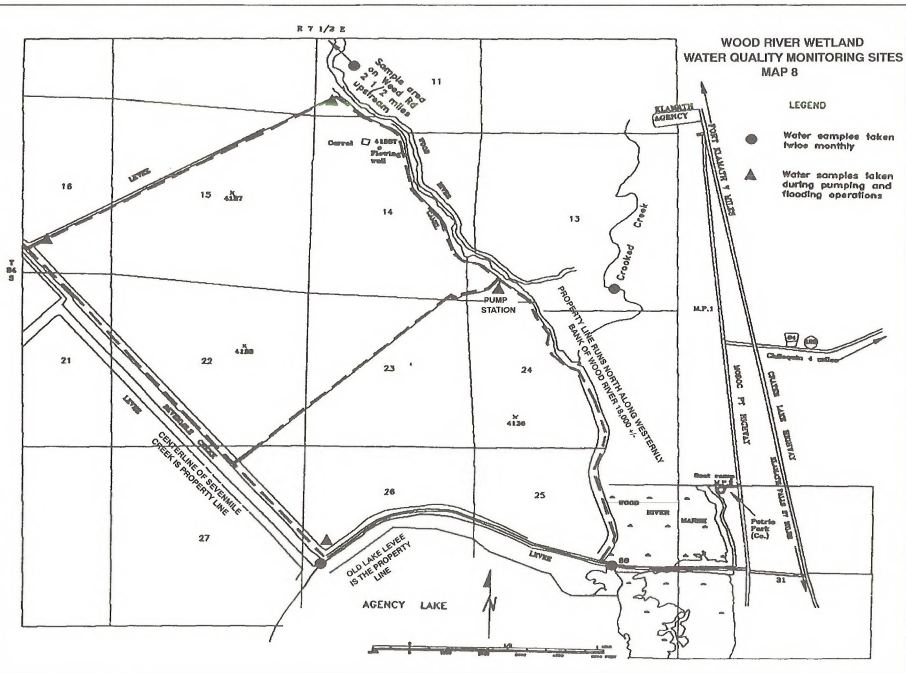
Standards/Methods

- ◆ Water quality sampling will continue using two parameters:
 - ◆ Physical/chemical analysis using methods described in Campbell, Ehinger, and Kann 1992. (need number of samples per month and sample locations) Water samples will be taken monthly for the first two years of management under an approved plan. Monthly samples would also be taken every other year for eight years following plan approval, (years 4, 6, 8, and 10). Parameters to be measured include temperature, dissolved oxygen, pH, turbidity, flow, nitrogen, phosphorus, trace minerals, and major ion concentration.
 - ◆ Macroinvertebrate samples will be taken at a minimum of the following locations:
 - The Wood River channel at the north end of the property.
 - The Wood River channel at the south end of the property.
 - Interior of the Wood River Marsh.
 - Interior of each cell of restored wetland.
- See Map 8.
- ◆ Samples will be taken in the spring and fall of the year. A species richness index will be used to compare sample results over time. Sampling will be conducted annually for the first ten years of management under an approved plan.
- ◆ The frequency of water quality sampling and testing, and macroinvertebrate sampling may be changed or new techniques added depending upon test results, new information, new locations, or other concerns that may require different sampling techniques or frequency.
- ◆ All management activities using Best Management Practices will be monitored to determine whether Best Management Practices are incorporated in the project design and correctly applied. This will be accomplished primarily through contract administration. Effectiveness monitoring will be designed to achieve statistical validity and will incorporate established standard monitoring methods. Selection of locations and water quality parameters for Best Management Practice effectiveness monitoring will consider beneficial use(s) likely to be affected, Best Management Practices being applied, and water quality criteria necessary to protect beneficial use(s).
- ◆ During the years that one or more surface disturbing activities occur, a minimum of one surface disturbing activity per year will be monitored to determine whether the Best Management Practice objectives for water resources are being met.

**WOOD RIVER WETLAND
WATER QUALITY MONITORING SITES
MAP 8**

LEGEND

- Water samples taken twice monthly
- ▲ Water samples taken during pumping and flooding operations



Appendix B - Wood River Wetland Plan Monitoring

- ◆ Monitoring to determine effectiveness of Best Management Practices in meeting water quality criteria will be conducted as determined necessary.
- ◆ All water bodies that are within or adjacent to an area treated with herbicide and support a beneficial use will be monitored to determine effectiveness of Best Management Practices in meeting water quality criteria.

Costs

Estimated expenses are:

- ◆ \$10,000 annually for physical/chemical analysis.
- ◆ \$2,500 annually for macroinvertebrate sampling and analysis.
- ◆ \$1,000 annually for Best Management Practices and water use monitoring.

Vegetation

Excted Future Conditions and Outputs

Restoration actions would be designed to promote the development of diverse, self-sustaining native plant communities that are typical of a functioning wetland.

Monitoring Questions

- ◆ What plant communities currently occur on the property and how do they compare to the relatively undisturbed plant communities occurring in the Wood River Marsh?
- ◆ What plant communities develop on the property as a result of restoration activities?
- ◆ How are the various plant communities related to environmental and microhabitat conditions?

Standards/Methods

- ◆ Initial vegetation data will be collected during the first growing season after removal of livestock grazing in order to establish a baseline with which to compare future vegetation changes.
- ◆ Vegetation data will be collected every year for the first three years and every three to five years after the third year.
- ◆ The releve' Method of Mueller-Dombois and Ellenberg (1974) would be used to evaluate changes in plant community over time, and differences in plant community between various sites within the Wood River property area. Approximately 30 sample plots will be systematically placed within the wetland areas outside of the proposed riparian areas. Sample plots would also be located in the Wood River Marsh that is east of the Wood River. Initial community analysis data would be collected from each plot to document the plant communities currently occurring on the property. Since the changes in plant community that may occur as a result of restoration actions is unknown, a minimal area cannot be determined for the size of the releve's. Therefore, it would be best to use a standard releve' size of 10 meters by 10 meters (100 square meters) for grassland-type plant communities (Mueller-Dombois and Ellenberg 1974).

In each releve' a complete species list is compiled and given a cover abundance rating each time the releve' is sampled (Mueller-Dombois and Ellenberg 1974). Analysis techniques include the dendrogram method which classifies releve's according to calculated similarity indices based on total species composition, and the synthesis table method which determines groups of differential species that characterize groups of releve's (Mueller-Dombois and Ellenberg 1974). Thus, similarities and differences of plant communities can be determined between various sites within the Wood River property wetland, and similarities and differences of plant communities can be determined on the same site through time. These data can also be used in other multivariate analyses such as ordination and detrended correspondence analysis (Gauch 1982). These data will include the data collected from the Wood River Marsh area.

Complementary data could be collected to monitor changes in cover of dominant plant species using the point frequency method (Mueller-Dombois and Ellenberg 1974). This method uses a point frequency frame that samples cover by species at predetermined intervals along permanent transects that would be located adjacent to or within the permanent sample plots.

Riparian vegetation would be monitored using the Stream Cross-Section and Greenline Survey methods that are used throughout the resource area to monitor riparian areas. See the Riparian section for a complete description of these methods.

Costs

Approximately \$3,000 per year for 30 sample plots (first three years, and every five years thereafter).

Riparian Areas

Expected Future Conditions and Outputs

Riparian areas will be managed to provide proper functioning stream and wetland ecosystems. Riparian areas will be maintained, improved, or created to provide habitat for wildlife and fish while insuring a diversity of native vegetation.

Monitoring Questions

- ◆ Are expansions of the flood plain resulting in new stream channel meanders and expanded riparian areas along the Wood River and Sevenmile Creek?
- ◆ Are riparian vegetation species establishing and expanding along the Wood River and Sevenmile Creek and their floodplains?
- ◆ Is the planting of native riparian tree and shrub species resulting in stable streambank conditions while providing a diversified habitat for fish and wildlife species?
- ◆ Are other management activities, such as prescribed fire and recreation developments, impacting the riparian areas?

Standards/Methods

- ◆ Baseline riparian vegetation data will be collected along the existing Wood River and Sevenmile Creek channels. Data will be collected during 1995 using the Stream Cross Section and Greenline Survey methods. This data collection will be repeated every 3-5 years on channels that remain unmodified. Additional data collection points will be added or existing points will be expanded if any modifications are made to the stream channels. Descriptions of these monitoring methods can be found in *Riparian Area Management: Greenline Riparian-Wetland Monitoring* TR 1737-8 1993. USDI - BLM and *Integrated Riparian Evaluation Guide*, Intermountain Region, March 1993. USDA - FS. Photo points will also be established at approximately $\frac{1}{4}$ mile intervals along Wood River and Sevenmile Creek to visually record changes in physical conditions due to the management actions. At each photo point an upstream, downstream, and across stream photo will be taken. The photo points will correspond to the cross section and greenline data collection points. Baseline photos will be taken in 1995 and will be repeated every 3-5 years and as modifications are made to the channels.
- ◆ Annual ocular surveys of tree and shrub plantings will be completed to determine the survival rates of the seedlings, vigor and to determine if they are providing diversified habitat components.
- ◆ Best Management Practices will be used during all management activities to provide for protection of existing and developing riparian areas. Descriptions of Best Management Practices can be found in *Interim Watershed Management Practices Guide*, February 1994, on file at the Klamath Falls Resource Area office.

Costs

An estimated \$3,000 annually to collect, record, and analyzed monitoring data.

Wildlife Habitat

Expected Future Conditions and Outputs

Wildlife habitat will be managed for wetland habitat diversity with the necessary quantity and quality to maintain or enhance wetland associated species currently using the property or species that would use the property if suitable habitat were available.

Monitoring Questions

- ◆ Are the shrub and tree clumps planted on the dikes providing the quantity and quality of habitat necessary for neotropical migrant birds?
- ◆ Are the vegetative management techniques (such as water control, grazing, and prescribed fire) meeting the objectives of creating and maintaining habitat diversity?
- ◆ Has placement of habitat structures (such as islands, boxes, poles, and tree plantings) met the needs of raptors, waterfowl, and other wildlife species.

Standards/Methods

- ◆ Inventories to measure the quantity and quality of existing habitats will be conducted. After major habitat manipulations are completed another inventory to measure habitat change will be initiated.
- ◆ Baseline monitoring for neotropical migratory bird use will be conducted in 1995. Monitoring will be conducted annually for an additional four years and thereafter at least once every three years. Trends in bird species richness and composition will be determined. Emphasis will be placed on determining the ratio of riparian/wetland associated birds to those associated with the lands managed for grazing (such as past management on the Wood River property).
- ◆ Baseline monitoring to establish presence and relative abundance of wildlife species will be conducted prior to any significant habitat manipulation (for example, wetland creation/enhancement and nest island construction). After each habitat manipulation, monitoring to measure change will be conducted.
- ◆ Baseline surveys for bats using the area will be conducted. Monitoring surveys will be conducted every three years.
- ◆ Baseline monitoring of amphibians will be conducted. Monitoring will be done on 5/10 year intervals.
- ◆ Waterfowl surveys will be conducted by other agencies. The Fish and Wildlife Service will conduct aerial surveys of the Wood River property. Waterfowl population estimates will be determined by the Fish and Wildlife Service and the Oregon Department of Fish and Wildlife as part of a Basin-wide effort.

Cost

An estimated \$7,500 per year for the first three years of baseline monitoring and \$2,500 per year for each additional year of monitoring.

Fish Habitat

Expected Future Conditions and Outputs

Maintenance and enhancement of fish habitat with diversity and quality capable of maintaining or enhancing resident and spawning trout and shortnose and Lost River suckers.

Monitoring Questions

- ◆ Are channel conditions improving in terms of structural complexity, hiding, foraging, and rearing conditions, and substrate composition?
- ◆ Are fish assemblages and relative population abundance estimates changing in response to changes in habitat structure?

Standards/Methods

- ◆ Riparian condition will be monitored for parameters affecting channel condition and fish habitat using cross-section riparian transects and greenline methods described in riparian monitoring section. Photopoints will be established for each riparian transect (1/4 mile intervals for Wood River and Sevenmile Creek and taken at intervals consistent with riparian monitoring.
- ◆ Channel morphology will be measured initially before each phase of restoration and at 5 to 7 year intervals thereafter and during the second year following major construction activities for affected reaches. Channel cross-section transect will be correlated with riparian photopoints and associated vegetation sampling.

Channel morphology parameters to be measured over time include:

Cross-sectional profiles of Wood River for each transect (initially every quarter mile).

Sinuosity (quantitative estimates for Wood River and Sevenmile Creek)

Substrate composition as a percentage of various substrate size classes (sampled for each cross-sectional transect).

- ◆ **Baseline Information.** Baseline fish distribution data will be collected for Wood River, Sevenmile Creek, and interior canal system before ground disturbing activities are implemented. Sampling will be conducted in late spring and early fall for each transect sampled that year. Entire area will be spot-checked for areas that stand out as exceptionally different in terms of fish abundance or composition from the sampled areas as a whole. Data elements to be collected during snorkel counts include species, sex (when possible) abundance, size class (measure of age class), habitat association, and behavior (e.g. spawning, feeding, hiding, etc). Related monitoring and inventories will be conducted by ODF&W, the Klamath Tribes, and the Bureau of Reclamation in Wood River and Agency Lake for Endangered Suckers and migratory and resident trout populations.
- ◆ **Wood River.** Three randomly located 200 meter snorkel transects for each of three distinct channel reaches will be sampled for species composition and relative abundance. Trap netting will be conducted on similar time-frames to corroborate and supplement snorkeling data.
- ◆ **Seven Mile Canal.** Three randomly located 200 meter snorkel transects along Sevenmile canal evenly distributed along canal between north and south property boundaries. Trap netting will be conducted on similar time-frames to corroborate and supplement snorkeling data.
- ◆ **Interior Canal System.** Three random 100 meter transects for each of three distinct canal types will be sampled using visual (or snorkeling), electroshocking, and seining techniques.
- ◆ The same sampling scenario will be employed at five year intervals after restoration implementation. The intensity and sampling stratification method will be adjusted according to variation found during baseline data collection.

Costs

An estimated \$4,000 annually, plus initial costs for equipment and baseline data collection of \$8,000.

Special Status Species

Expected Future Conditions and Outputs

Conservation or recovery of special status species and their habitats so that listing under the Endangered Species Act (ESA) is not needed.

Monitoring Questions

- ◆ Are BLM actions and BLM authorized actions designed and executed to protect or enhance special status species and/or their habitat to the extent required by the ESA, Bureau policy, or as directed in this RMP?
- ◆ Are the mitigation and protection measures employed effective?

Standards/Methods

- ◆ Each year's project files will be reviewed annually to evaluate related recommendations and decisions regarding special status species and in light of ESA requirements, policy, and RMP decisions. If mitigation was required, review will ascertain whether such mitigation was incorporated in the authorization document and if mitigation was carried out as planned on the ground.
- ◆ Habitat conditions will be monitored at all or a representative sampling of known sites of all listed, proposed, candidate, State listed, and Bureau sensitive plant and animal species identified as occupying sites potentially affected by Bureau actions, both before and within a year after site disturbance and/or at intervals of at least five years. Population trends of plants in those categories at such sites will also be monitored. Such monitoring will specifically evaluate effectiveness of mitigating measures.

Costs

An estimated \$500 annually for the first standard above, and approximately \$1,000 per site each year visited.

Area of Critical Environmental Concern (ACEC)

Expected Future Conditions and Outputs

Maintenance of the ACEC in accordance with the objectives established for it, to protect the values for which it was designated.

Monitoring Questions

- ◆ Are BLM actions and BLM-authorized actions consistent with RMP objectives for designated ACEC?
- ◆ Are the special values of the ACEC being maintained?
- ◆ Has a baseline inventory of relevant values been conducted? What is their present condition?

Standards/Methods

- ◆ All actions within and adjacent to the ACEC will be reviewed to determine whether the possibility of impacts on the ACEC values was considered, and whether any mitigation identified as important for maintenance of ACEC values was required and, if so, was actually implemented.
- ◆ The ACEC will be monitored annually to determine if unauthorized uses are occurring and whether ACEC values are being maintained.

Costs

An estimated average of \$500 annually.

Visual Resources

Expected Future Conditions and Outputs

The Wood River property is in a highly modified condition and are currently estimated to be in Visual Resource Management (VRM) Class IV condition. In the long term, the Wood River property would be managed to meet (VRM) Class II objectives, which would include moving toward a natural wetland community environment.

Monitoring Questions

- ◆ Are management actions in VRM Class II areas meeting or exceeding visual resource management class objectives?

Standards/Methods

- ◆ Upon completion of a major surface-disturbing project, the visual resource will be evaluated to determine if the VRM Class II objectives were met.

Costs

An estimated \$1,000 annually.

Recreation

Expected Future Conditions and Outputs

Recreation use will be monitored to maintain and manage for a low to moderate level of use and to identify any conflicts. The types of recreation facilities appropriate to these use levels would be determined.

Monitoring Questions

- ◆ Are there conflicting recreation uses occurring?
- ◆ Are there impacts to other resources from recreation use?
- ◆ What level and patterns of visitor use are occurring?
- ◆ At what times during the calendar year is use occurring?
- ◆ What types of recreation use are occurring?

Standards/Methods

- ◆ Monitoring would be done throughout the year using seasonal, volunteer and other resource specialists. Monitoring techniques would include visitor registers, informal BLM surveys, traffic counts and photography. The information gathered from monitoring would be used in determining if additional on-site controls or facilities are needed to meet recreation or other resource objectives.

Costs

An estimated \$2,000 annually for recreation use monitoring.

Grazing Management

Expected Future Conditions and Outputs

Livestock grazing may be used as a tool for manipulating vegetation or achieving some other Wood River plan goal. A grazing prescription would be developed to identify how the goals and objectives for vegetation removal would be accomplished in conformance with the approved plan and its specific management standards and objectives. This will be completed through a team of interdisciplinary resource specialists.

Monitoring Questions

- ◆ Are goals and objectives for vegetation, riparian, and water quality being met?

Standards/Methods

- ◆ Use approved BLM monitoring techniques to analyze present management systems. Monitoring is a tool to see if resource goals and objectives are being met. Specific monitoring techniques would follow the 1988 Oregon Rangeland Monitoring Handbook and the BLM Grazing Technical Reference Series.
- ◆ Changes in riparian condition will be monitored directly through vegetation analysis and indirectly through monitoring for wildlife and fish species (neotropical migrants, small mammals, etc.).

Costs

An estimated \$500 per grazing period for each project.

Best Management Practices

Introduction

The best management practices described in this appendix are designed to achieve the objectives of maintaining or improving water quality and soil productivity and the protection of riparian-wetland areas. The goal of the practices listed is to prevent or mitigate adverse impacts while meeting other resource objectives.

These best management practices are a compilation of existing policies and guidelines and commonly employed practices to minimize water quality degradation and loss of soil productivity. These best management practices are considered the primary mechanisms to achieve Oregon water quality standards. This appendix is excerpted from the Klamath Falls Resource Area Approved Resource Management Plan. That approved Resource Management Plan Best Management Practices appendix should be considered more complete and accurate when referencing best management practices. For example, some best management practices in the Klamath Falls Resource Area plan that were not included in this appendix may be applicable on the Wood River property, while some of the best management practices in this appendix may not be applicable.

Nonpoint sources of pollution result from natural causes, human actions, and the interactions between natural events and conditions associated with human use of the land and its resources. Nonpoint source pollution is caused by diffuse sources rather than from a discharge at a specific, single location. Such pollution results in alteration of the chemical, physical, and biological integrity of water. Erosion from a harvest unit or surface erosion from a road are some examples of nonpoint sources.

Best management practices are defined as methods, measures or practices selected on the basis of site-specific conditions to ensure that water quality will be maintained at its highest practicable level. Best management practices include, but are not limited to, structural and nonstructural controls, operations, and maintenance procedures. Best management practices can be applied before, during, and after pollution-producing activities to reduce or eliminate the introduction of pollutants into receiving waters (40 Code of Federal Regulations 130.2, Environmental Protection Agency Water Quality Standards Regulation).

Best management practices are identified as part of the National Environmental Policy Act process, with interdisciplinary involvement. Because the control of nonpoint sources of pollution is an ongoing process, continual refinement of best management practices design is necessary. This process can be described in five steps, which are: 1) selection of design of a specific best management practices; 2) application of the best management practices; 3) monitoring; 4) evaluation; and 5) feedback. Data gathered through monitoring is evaluated and is used to identify changes needed in best management practices design, application, or in the monitoring program.

Monitoring of soil, water, and riparian-wetland resources conducted by the Klamath Falls Resource Area is described in the following documents: The Klamath Falls Resource Area Interdisciplinary Rangeland Monitoring Plan; Appendix O in the Klamath Falls Resource Area Proposed Resource Management Plan and Environmental Impact Statement; and BLM Manual Supplement 1743-2, *Rangeland Monitoring Handbook*.

Use

The goal of this document is to identify water quality and soil objectives for various management actions. The practices listed below each management action are given as examples of best management practices which are effective in achieving the water and soil objectives. Best management practices are selected and implemented as necessary based on site-specific conditions to meet water and soil objectives for specific management actions. This document does not provide an exhaustive list of best management practices. Additional best management practices may be identified during the interdisciplinary process when evaluating site-specific management actions. Implementation and effectiveness of best management practices need to be monitored to determine whether the practices are achieving water and soil objectives. Adjustments will be made as necessary to ensure objectives are met and as needed to conform with changes in Bureau of Land Management policy, direction, or new information.

Organization

This Appendix is organized by management activities plus separate sections which address activity planning and design, riparian-wetland areas, and fragile soils. Objectives are stated under each management activity followed by a list of practices designed to achieve these objectives.

Any best management practices that corresponds with a Standard and Guideline from the Record of Decision for the Supplemental Environmental Impact Statement has the number of the Standard and Guideline referenced in bold.

Legislation and Regulations

This document is designed to ensure compliance with the:

Clean Water Act of 1972, as amended (1977 and 1987). Section 319 of the Clean Water Act Amendments of 1987 (Water Quality Act) requires that the states determine those waters that will not meet the goals of the Act, to determine those nonpoint source activities that are contributing pollution, and to develop a process of determining best management practices to reduce such pollution to the "maximum extent practicable".

Oregon Administrative Rules (Chapter 340, sections: 340-41-026,027,965). Department of Environmental Quality. Oregon's Administrative Rules contain water quality standards for the identified beneficial uses of water in relation to the antidegradation policy, the requirement for the highest and best control of waste activities, temperature and turbidity.

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Activity Planning and Design

A. Planning

Objective: *To include soil productivity, water quality and hydrologic considerations in activity planning.*

- Practices:**
- (1) **Incorporate landscape-level analysis and watershed analysis into project and activity planning.** Watershed analysis consists of: identifying principal issues within a particular watershed; identifying existing and desired conditions (as driven by the principal issues); identifying those processes and activities that need to be modified to achieve the desired watershed conditions; identifying restoration opportunities; and identifying planning and coordination requirements. Guidance on developing watershed restoration projects and for conducting watershed analysis can be found in Chapter 2 of the Proposed Klamath Falls Resource Area Resource Management Plan/Environmental Impact Statement and in other issued guidance.
 - (2) Use the planning process to identify, evaluate, and map potential problems (for example, slump prone areas, saturated areas and slide areas).
 - (3) Develop activity plans for third to fifth order watersheds to minimize detrimental cumulative effects on water quality and quantity.
 - (4) Analyze watershed cumulative effects and provide mitigation measures if necessary to meet water quality requirements (see Cumulative Effects below).
 - (5) Disperse activities over time and space.
 - (6) Identify in-stream flows needed to maintain riparian resources, channel conditions, fish passage, and aquatic habitat.

Objective: *To restore and maintain riparian-wetland areas so that 75 percent or more are in proper functioning condition by 1997. The overall objective is to achieve an advanced ecological status (late successional), except where resource management objectives, including proper functioning condition, would require an earlier successional stage.*

- Practices:**
- (1) Assess the current status of a riparian-wetland area in terms of functioning condition and ecological status (see the Definitions and Proper Functioning Condition section for a list of reference materials).
 - (2) Use the methods outlined in the Definitions and Proper Functioning Condition section and BLM Technical Reference 1737-9, *Process for Assessing Proper Functioning Condition* to determine proper functioning condition and to determine the desired functioning and ecological condition for a riparian-wetland area.

B. Design

Objective: *To ensure that management activities maintain favorable conditions of soil productivity, water flow, water quality, and fish habitat.*

- Practices:**
- (1) Design proposed management activities to avoid potential adverse impacts to soil and water. Evaluate factors such as soil characteristics, watershed physiography, current watershed and stream channel conditions, proposed roads, season of activity, etc., to determine impacts of proposed management activities.
 - (2) Design mitigation measures if unavoidable adverse impacts to water quality/quantity or soil productivity may result from the proposed action.

C. Maps/Contract Requirements

Objective: *To identify areas to be protected and to ensure their protection on the ground.*

Practices: Include the following on activity maps and/or contracts:

- (1) Location of all stream channels and riparian-wetland areas (springs, meadows, lakes, bogs, etc.).
- (2) Stipulations required for each stream channel and riparian-wetland area.
- (3) Location of water sources available for Contractor's use (see the Water Source Development and Use section).
- (4) Location of water sources to be used for management activities (see the Water Source Development and Use section).

D. Cumulative Effects

Objective: *To minimize detrimental impacts on water and soil resources resulting from the cumulative effect of land management activities within a watershed.*

Practices: (1) When and where possible, coordinate scheduling of management activities such as, road construction, and watershed enhancement activities with other landowners in the watershed.

- (2) **Identify watersheds with a high level of cumulative effects.** Conduct cumulative effects analysis as required by the National Environmental Policy Act process. Cumulative effects analysis assesses the effects of a proposed action on the environment; the following procedure is only one method of doing so. There is no required standard analysis procedure for cumulative impacts. Cumulative effects analysis is separate, but similar, to analyses conducted for Section 7 Consultation with the U.S. Fish and Wildlife Service. Information in one can be incorporated into the other. Watershed analysis provides information for the "Affected Environment" and "Management Opportunity" portions of a National Environmental Policy Act or planning document, but does not analyze impacts. Cumulative effects analysis supplements and supports watershed analysis.

a. Use the following general guidelines to delineate watersheds for cumulative effects analyses.

- 1) Use natural drainage boundaries.
- 2) Use third to fifth order drainages.
- 3) Size ranges from 500 to 10,000 acres.
- 4) Locate lower boundary based on a state-recognized beneficial use.

b. The extent to which any or all of the following criteria exist would determine which watersheds have a high risk for water quality degradation due to cumulative effects. The criteria are not listed in order of priority.

- 1) Highly erodible soils.
- 2) High equivalent clearcut area.
- 3) Large area of compacted soil.
- 4) High level of non-recovered openings in transient snow zone.
- 5) High sedimentation potential.
- 6) Poor to fair channel stability or condition.
- 7) Poor to fair riparian condition.
- 8) High impact from catastrophic event (for example, wildfire).
- 9) High road density.

- 10) Potential for adverse impact on a beneficial use.
 - 11) Monitoring data shows that water quality does not meet state water quality standards.
- (3) After initial analysis, an intensive evaluation should include the nature of the problem, the cause of the problem, and a specific plan with objectives and alternatives for recovery and mitigation. Water monitoring may also be initiated to validate the conclusion of the impact analysis and to establish baseline data. This step complements, and may be an integral part of conducting a watershed analysis.
- (4) Based on site-specific conditions, select and apply one or more special management practices such as the following to mitigate water quality impacts in **high risk or highly impacted watersheds**.
- a. Develop and implement a watershed/riparian enhancement plan and encourage coordination with landowners.
 - b. Require plans of operation for mining and rights-of-way. Require a management plan for grazing.
 - c. Defer the watershed from management activities which would potentially degrade water quality for approximately five years. Reanalyze the watershed.
 - d. Increase widths of Riparian Reserves to provide additional protection.
 - e. Incorporate watershed and riparian-wetland area management objectives into existing plans (Coordinated Resource Management Plans, Allotment Management Plans, etc.) where practicable.
 - f. Minimize existing and prevent additional road caused impacts:
 - ◆ reduce road densities by obliterating roads or reduce open road densities through road closures
 - ◆ minimize road width and clearing limits
 - ◆ require transport of excavated materials to appropriate disposal site (end hauling)
 - ◆ prohibit new road construction
 - ◆ surface all roads
 - ◆ require seasonal restriction with no waivers for construction, renovation and hauling
 - ◆ require special low impact maintenance and construction techniques
 - ◆ no roadside brushing/grubbing with excavator
 - ◆ no blading and ditch pulling in the wet season unless essential to provide drainage
 - ◆ rock ditch lines
 - ◆ pull back sidecast from road construction and recontour roadway
 - ◆ remove culverts and reshape drainage crossings
 - g. Restrict or officially close the watershed to off-road vehicle use and enforce the closure.
 - h. Implement regular compliance reviews on all activities in the watershed.
 - i. Assess trade-offs between wildfire suppression impacts and wildfire damage; plan suppression levels accordingly. Limit use of heavy equipment during wildfire suppression (see the Wildfire and Prescribed Fire section).

E. Permits

Objective: *To minimize detrimental impacts on water and riparian-wetland resources and to comply with the Clean Water Act.*

Practice: Obtain appropriate and necessary permits from the Oregon Department of Environmental Quality (through the Oregon Division of State lands) and the U.S. Army Corps of Engineers for projects potentially affecting waters of the state and/or wetlands. Guidance regarding permit requirements for resource management activities is outlined in BLM Manual 9188: Nonpoint Source Pollution Control and in 33 Code of Federal Regulations 330.

Riparian Reserves

Introduction

An *Aquatic Conservation Strategy* is outlined in Chapter 2 of the Klamath Falls Resource Management Plan Environmental Impact Statement that is aimed at restoring and maintaining the ecological health of watersheds, providing a scientific basis for protecting the aquatic ecosystem, and to enable planning for sustainable resource management.

The objectives of the *Aquatic Conservation Strategy* are:

- ◆ maintain and restore the distribution, diversity, and complexity of watershed and landscape-scale features to ensure protection of the aquatic systems to which species, populations and communities are uniquely adapted;
- ◆ maintain and restore spatial and temporal connectivity within and between watersheds. Lateral, longitudinal, and drainage network connections include floodplains, wetlands, upslope areas, headwater tributaries, and intact refugia. These network connections must provide chemically and physically unobstructed routes to areas critical for fulfilling life history requirements of aquatic and riparian-dependent species;
- ◆ maintain and restore the physical integrity of the aquatic system, including shorelines, banks, and bottom configurations;
- ◆ maintain and restore water quality necessary to support healthy riparian, aquatic, and wetland ecosystems. Water quality must remain in the range that maintains the biological, physical, and chemical integrity of the system and benefits survival, growth, reproduction, and migration of individuals composing aquatic and riparian communities;
- ◆ maintain and restore the sediment regime under which the aquatic system evolved. Elements of the sediment regime include the timing, volume, rate, and character of sediment input, storage, and transport;
- ◆ maintain and restore in-stream flows sufficient to create and sustain riparian, aquatic, and wetland habitats and to retain patterns of sediment, nutrient, and wood routing. The timing, magnitude, duration, and spatial distribution of peak, high, and low flows must be protected;
- ◆ maintain and restore the timing, variability, and duration of floodplain inundation and water table elevation in meadows and wetlands;
- ◆ maintain and restore the species composition and structural diversity of plant communities in riparian-wetland areas and wetlands to provide adequate summer and winter thermal regulation, nutrient filtering, appropriate rates of surface erosion, bank erosion, and channel migration and to supply amounts and distributions of coarse woody debris sufficient to sustain physical complexity and stability; and
- ◆ maintain and restore habitat to support well-distributed populations of native plant, invertebrate, and vertebrate riparian-dependent species.

The components of the *Aquatic Conservation Strategy* are:

1. **Riparian Reserves:** Riparian Reserves are lands along streams and unstable and potentially unstable areas where special standards and guidelines direct land use. The prescribed widths of these Riparian Reserves for various stream and riparian-wetland area categories are described in Table B-1. These widths are intended to provide a high level of fish, wildlife and plant habitat and riparian-wetland area protection until watershed and site analysis can be completed. Although Riparian Reserve boundaries on permanently flowing streams may be adjusted, these are considered to be the approximate widths necessary for attaining Aquatic Conservation Strategy objectives. Post-watershed analysis Riparian Reserve boundaries for permanently flowing streams will approximate the boundaries described in Section III A. Following watershed analysis, Riparian Reserve boundaries for intermittent streams may be

different from the existing boundaries. Determination of final boundaries will be based on hydrologic, geomorphic and ecologic processes in a watershed affecting intermittent streams. The widths of Riparian Reserves apply to all watersheds until watershed analysis is completed, a site-specific analysis is conducted and described, and the rationale for final Riparian Reserve boundaries is presented through the appropriate National Environmental Policy Act decision-making process.

Table B-1. Riparian Reserve Widths (in feet).

Stream/Waterbody/Wetland Type	Slope Distance of Riparian Reserve
Fish Bearing Streams	300 feet
Intermittent Streams	100 feet, or to a distance equal to the height of one site potential tree
Constructed Ponds and Reservoirs and Wetlands greater than 1 acre	150 feet
Lakes and Natural Ponds	300 feet
Wetlands less than 1 acre and Unstable and Potentially Unstable Areas	The extent of unstable and potentially unstable areas; or the wetland to the outer edges of the riparian vegetation.

- 2. Key Watersheds:** Key Watersheds are a system of large refugia comprising watersheds that are crucial to at-risk fish species and stocks and provide high quality water. The Key Watersheds in the Klamath Falls Resource Area are: **Spencer Creek (Tier 1), Clover Creek (Tier 2) and Jenny Creek (Tier 1).**
- 3. Watershed Analysis:** Watershed analysis is a set of procedures for conducting an analysis to evaluate geomorphic and ecologic processes operating within a specific watershed. This analysis should enable watershed planning that achieves the Aquatic Conservation Strategy objectives. Watershed analysis provides the basis for monitoring and restoration programs and is the foundation from which Riparian Reserves can be delineated. Guidance for conducting watershed analysis is outlined in various other manuals and documents.
- 4. Watershed Restoration:** Watershed Restoration is a comprehensive, long-term program of restoration to restore watershed health and aquatic ecosystems, including the habitats supporting fish and other aquatic and riparian-dependent organisms.

A. Riparian Reserve Designation

Objectives: *To designate an area along streams, lakes, ponds, and other waters for management and protection of riparian-wetland areas and water quality.*

Practices: (1) Establish Riparian Reserves on streams and water bodies as listed in the table below. To use this table, a) determine if the stream in a proposed activity area is fish bearing; b) determine if the stream is perennial or intermittent (see the Definitions and Proper Functioning Condition section); c) determine if the area is unstable or potentially unstable (this will be a rare designation in the Klamath Falls Resource Area).

Watershed analysis will identify critical hillslope, riparian, and channel processes that must be evaluated in order to delineate Riparian Reserves that assure protection of riparian and aquatic functions. Project-level consideration of these processes and features will be the basis on which site-specific Riparian Reserves are delineated. The Riparian Reserve widths in the following table apply until watershed analysis is completed, a site-specific analysis is conducted and described, and the rationale for final Riparian Reserve boundaries is presented.

Minimum widths of Riparian Reserves are expressed as whichever slope distance is greatest. The widths listed in the table are those that would be applied to one side of the stream. For example, a fish-bearing stream would have a 600 foot buffer (300 feet each side). In addition to these widths, Riparian Reserves must extend from the edges of the active stream channel to the top of the inner gorge, or to the outer edges of the 100-year floodplain, and to the outer edges of riparian vegetation. Wetland, pond and reservoir Riparian Reserves must include the body of water or wetland and the area from the outer edges of the riparian vegetation, or to the extent of seasonally saturated soil, or to the extent of unstable or potentially unstable areas. Reservoir and pond Riparian Reserves are to be measured from the edge of the maximum pool elevation.

(2) Use the following sequence of decisions when establishing Riparian Reserve boundaries:

- a. **Identify floodplain boundaries** The entire 100-year floodplain should be included within the Riparian Reserve. The topographic break in slope between hillsides and the relatively flat floor of the stream valley will define a floodplain boundary. Floodplain soils and substrates are characterized by rounded edges on gravels, cobbles, or boulders as a result of being tumbled by streams. In contrast, hillslope substrates are more sharp and angular. Vegetation may change in age or composition at floodplain boundaries; however, many floodplains have forest vegetation as old or older than hillslope stands. Smaller, incised (downcut) streams and lower order (first, second, and third) streams frequently lack floodplains. Also, floodplains may not exist along non-riverine wetlands and lakes. In the absence of floodplains, historical high water levels should be used (see Section b, below).
- b. **Locate margins of active channels and shorelines (high water mark)** After floodplains (if they exist) have been identified, Riparian Reserves are delineated. Delineation of the Riparian Reserve starts at the edge of the active channel or mean high water level, and extends outward horizontally on both sides. Active channels consist of all portions of the stream channel carrying water at normal high flows, not just the current wetted channel. This includes side channels and backwaters which may not carry water during summer low flow. All islands and gravel bars are included as part of the active channel. Active channel boundaries are indicated by abrupt topographic breaks where frequent channel scour has steepened streambanks. Frequently, plant abundance is reduced in areas of active channel modification, and plant communities are dominated by herbs and forbs. The high water mark is often marked by the vegetative litter carried in high flows and then deposited or caught in live vegetation.

Riparian Reserves around reservoirs, ponds and lakes should be measured from the high water level. This level may be indicated by evidence of erosion by wave action, reduced plant cover, topographic features and sharp transitions in plant community composition.

- c. **Lay Out Riparian Reserve Boundaries** For optimal management of riparian and other resources, Riparian Reserves should have variable widths that are delineated at ecological boundaries, not at arbitrary distances from the stream, lake or wetlands. Riparian-wetland areas are naturally irregular or asymmetrical in shape, in response to local topography, geology, groundwater, and plant communities. Consideration of topographic irregularities can both protect riparian resources. Avoid straight, uniform Riparian Reserve boundaries.

B. Riparian Reserve Protection

Objective: *To prevent damage to riparian vegetation and disturbance to streambanks, maintain or improve riparian conditions that support water-related functions, protect the natural flow of streams, and preserve nutrient cycling from woody debris.*

Practices: No timber harvest will be planned within a Riparian Reserve as part of the sustained yield timber management program. Where catastrophic events such as fire, flooding, wind or insect damage result in degraded riparian conditions, allow salvage and firewood cutting if required to attain Aquatic Conservation Strategy Objectives. Remove salvage trees only when watershed analysis determines that present and future woody debris needs are met and other Aquatic Conservation Strategy Objectives are not adversely affected.

Apply silvicultural practices in Riparian Reserves to control stocking, reestablish and manage stands, and acquire desired vegetation characteristics needed to attain Aquatic Conservation Strategy Objectives.

- (1) Retain all snags in the Riparian Reserve except where safety or fire hazard dictate removal.
- (2) Livestock grazing management in riparian-wetland areas will only be used to achieve the long term goals outlined in this Resource Management Plan.
- (3) Use interdisciplinary teams to develop riparian enhancement plans for rehabilitation of Riparian Reserves. Placement of large woody debris, creation of snags, planting trees and shrubs, or prescribed fire would be used where appropriate for riparian enhancement.
- (4) Avoid refueling, equipment maintenance, fuel storage, or other handling of petroleum products or other chemicals in or adjacent to Riparian Reserves.
- (5) In Riparian Reserves, although riparian-wetland enhancement or wildlife projects can be allowed that consist of these types of activities in order to meet Aquatic Conservation Strategy Objectives. Other activities, such as mining, livestock grazing, and recreation are to be conducted in Riparian Reserves as described in the Mining, Livestock Grazing, and Recreation and Off-Highway Vehicle Use sections, respectively.
- (6) For proposed hydroelectric projects under the jurisdiction of the Federal Energy Regulatory Commission, provide timely, written comments regarding maintenance of instream flows and habitat conditions and maintenance/restoration of riparian resources and stream channel integrity. Request the Federal Energy Regulatory Commission to locate proposed support facilities outside of Riparian Reserves. For existing support facilities inside Riparian Reserves that are essential to proper management, provide recommendations to the Commission that ensure Aquatic Conservation Strategy objectives are met. Where these objectives cannot be met, provide recommendations to the Federal Energy Regulatory Commission that such support facilities should be relocated. Existing support facilities that must be located in Riparian Reserves should be located, operated, and maintained with an emphasis to eliminate adverse effects that retard or prevent attainment of Aquatic Conservation Strategy objectives.

For other hydroelectric and surface water development proposals in Tier 1 Key Watersheds, require instream flows and habitat conditions that maintain or restore riparian resources, favorable channel conditions, and fish passage. Coordinate this process with the appropriate state agencies. For other hydroelectric and surface water development proposals in all other watersheds, give priority emphasis to instream flows and habitat conditions that maintain or restore riparian resources, favorable channel conditions, and fish passage. Coordinate this process with the appropriate state agencies.

- (7) Issue leases, permits, rights-of-way, and easements to avoid adverse effects that retard or prevent attainment of Aquatic Conservation Strategy Objectives. Where legally possible,

adjust existing leases, permits, rights-of-way, and easements to eliminate adverse effects that retard or prevent the attainment of Aquatic Conservation Strategy Objectives. If adjustments are not effective and where legally possible, eliminate the activity. Priority for modifying existing leases, permits, rights-of-way and easements will be based on the actual or potential impact to and the ecological value of the riparian resources affected.

- (8) Use land acquisition, exchange, and conservation easements to meet Aquatic Conservation Strategy objectives and facilitate restoration of fish stocks and other species at risk of extinction.

C. Wetlands

Objective: *To maintain the integrity and function of wetlands.*

Practices: (1) Manage vegetation to protect or enhance wetland areas.

- (2) Avoid surface disturbing activities in or adjacent to wetlands, other than those necessary for restoration or enhancement.

- (3) Avoid operations which would put pollutants into a wetland.

- (4) Follow practices outlined in the following sections: Permits under Activity Planning and Design; and Riparian Reserve Designation and Protection under the Riparian Reserves section.

Soil Resource Protection

A. Limiting Detrimental Soil Conditions

Objective: *To minimize soil erosion and soil productivity losses.*

Practice: The cumulative effects of detrimental soil conditions are not to exceed 20 percent of the total acreage within an activity area. Detrimental soils conditions include detrimental compaction (see the Definitions and Proper Functioning Condition section), displacement, and creation of adverse cover conditions. Sites where the 20 percent standard is exceeded will require treatment, such as ripping, backblading or seeding.

B. Soil Cover Retention and Establishment

Objective: *To retain and establish an adequate vegetative cover on disturbed sites to prevent erosion.*

Practices: (1) Minimum guidelines for the retention of effective ground cover will be prescribed as outlined in the following table for all soil-disturbing activities. Exceptions to these guidelines may be made due to site-specific resource considerations (for example, scarification projects where bare soil is a specific objective). Effective ground cover is all living or dead herbaceous or woody materials and all rock fragments greater than 0.5 inch in diameter in contact with the ground surface. See Table B-2.

Table B-2. Erosion Potential.

Soil Surface Erosion Potential	General Slope Range (percent)	Minimum Effective Ground Cover (percent)	
		First Year	Second Year
Low	0-20	20-30	30-40

Soil surface erosion potential can be estimated using a variety of methods (that is, the Revised Universal Soil Loss Equation—RUSLE). A hydrologist or other knowledgeable resource professional can provide assistance in determining soil surface erosion potential.

- (2) Use native vegetation which allows natural succession to occur. Avoid interference with reforestation operations. Include application of seed, mulch, and fertilizer as necessary. Complete prior to fall rains.

Roads

A. Planning

Objective: *To plan road systems that meet resource objectives and minimize detrimental impacts on water and soil resources.*

- Practices:**
- (1) Use an interdisciplinary team to develop an overall transportation system and Transportation Management Objectives.
 - (2) Develop Transportation Management Objectives to meet Aquatic Conservation Strategy Objectives. As a minimum, Transportation Management Objectives will include provisions for the following activities: during-storm inspections and maintenance; post-storm inspections and maintenance; during road operation and maintenance, giving high priority to the identification and correction of road drainage problems that contribute to degradation of riparian resources; regulation of traffic during wet periods to prevent damage to riparian resources; and establishment of the purpose of each road.
 - (3) Establish Transportation Management Objectives that minimize adverse environmental impacts.
 - (4) Avoid fragile and unstable areas.
 - (5) Encourage use of best management practices where not specifically required in reciprocal right-of-way agreements.
 - (6) Cooperate with Federal, state, and county agencies to achieve consistency in road design, operation, and maintenance necessary to attain Aquatic Conservation Strategy Objectives.
 - (7) Complete a watershed analysis (including appropriate geotechnical analyses) prior to any decision to construct a new road in a Riparian Reserve. Reduce existing road mileage in Key Watersheds and/or allow no net increase in road mileage in Key Watersheds.

- (8) Determine the influence of each road on the Aquatic Conservation Strategy objectives through watershed analysis. Meet Aquatic Conservation Strategy objectives by: reconstructing roads and associated drainage features that pose a substantial risk; prioritizing reconstruction based on current and potential impact to riparian resources and the ecological value of the riparian resources affected; closing and stabilizing, or obliterating and stabilizing roads based on the ongoing and potential effects to Aquatic Conservation Strategy objectives and considering short-term and long-term transportation needs.

B. Location

Objective: *To minimize soil erosion, water quality degradation, and disturbance of riparian vegetation.*

Practices: (1) Locate roads away from Riparian Reserves.

- (2) Locate stream crossing sites where channels are well defined, unobstructed and straight. Minimize the area of road that enters a Riparian Reserve.

C. Design

1. General

Objective: *To design the lowest standard of road consistent with use objectives and resource protection needs.*

Practices: (1) Base road design standards and design criteria on Transportation Management Objectives, such as traffic requirements of the proposed activity, the overall Resource Area transportation plan, economic considerations, safety requirements, resource objectives, and the need to minimize damage to the environment.

- (2) Consider future maintenance concerns and needs when designing roads.

- (3) Preferred road gradients are 2 to 10 percent with a maximum grade of 15 percent. Consider steeper grades in those situations where they will result in less environmental impact.

- (4) Road Surface Configurations

- a. Outsloping - sloping the road prism to the outside edge for surface drainage is normally recommended for local spurs or minor collector roads where low volume traffic and lower traffic speeds are anticipated. It is also recommended in situations where long intervals between maintenance will occur and where minimum excavation is desired. Outsloping is not recommended on gradients greater than 8 to 10 percent.
- b. Crown and Ditch - this configuration is recommended for arterial and collector roads where traffic volume, speed, intensity and user comfort are a consideration. Gradients may range from 2 to 15 percent as long as adequate drainage away from the road surface and ditchlines is maintained.

- (5) Locate waste areas suitable for depositing excess excavated material.

- (6) Surface roads if they will be subject to traffic during wet weather. The depth and gradation of surfacing will be determined by traffic type, frequency, weight, maintenance objectives, and the stability and strength of the road foundation and surface materials.

- (7) Provide vegetative or artificial stabilization of cut and fill slopes in the design process. Avoid establishment of vegetation where it inhibits drainage from the road surface or where it restricts safety or maintenance.

- (8) Prior to completion of design drawings, field check the design to assure that it fits the terrain, drainage needs have been satisfied, and all critical slope conditions have been identified and adequate design solutions applied.
- (9) Minimize the disruption of natural hydrologic flow paths, including diversion of streamflow and interception of surface and subsurface flow.

2. Surface Cross Drains

Objective: *To design road drainage systems that minimize concentrated water volume and velocity and therefore to reduce soil movement and maintain water quality.*

- Practices:**
- (1) Design cross drains in ephemeral or intermittent channels to lay on solid ground rather than on fill material to avoid road failures.
 - (2) Design placement of all surface cross drains to avoid discharge onto erodible (unprotected) slopes or directly into stream channels. Provide a buffer or sediment basin between the cross drain outlet and the stream channel.
 - (3) Locate culvert or drainage dips in such a manner to avoid discharge onto unstable terrain such as headwalls, slumps, or block failure zones. Provide adequate spacing to avoid accumulation of water in ditches or surfaces through these areas.
 - (4) Provide energy dissipators (for example, rock material) at cross drain outlets or drain dips where water is discharged onto loose material or erodible soil or steep slopes.
 - (5) Place protective rock at culvert entrance to streamline water flow and reduce erosion.
 - (6) Use the guide for drainage spacing by soil erosion classes and road grade shown in **Tables B-7 and B-8** at the end of this appendix.
 - (7) Use drainage dips in place of culvert on roads which have gradients less than 10 percent or where road management objectives result in blocking roads. Avoid drainage dips on road gradients greater than 10 percent.
 - (8) Locate drainage dips where water might accumulate or where there is an outside berm which prevents drainage from the roadway.
 - (9) When sediment is a problem, design cross drainage culverts or drainage dips immediately upgrade of stream crossings to prevent ditch sediment from entering the stream.
 - (10) Varying gradients is recommended in erodible and unstable soils to reduce surface water volume and velocities and culvert requirements.

3. Permanent Stream Crossings

Objective: *To prevent stream crossings from being a direct source of sediment to streams thus minimizing water quality degradation; to provide unobstructed access to spawning and rearing areas for anadromous and resident fish.*

- Practices:**
- (1) Design culverts to provide adult and juvenile fish passage both upstream and downstream. Use pipe arch culverts on most fishery streams. Use bottomless arch culverts and bridges where stream gradients are greater than 5 percent, to accommodate stream discharge, and when the value of the fishery resource dictates special engineering considerations necessary to ensure uninterrupted fish passage. On fish bearing streams, culverts should be placed at a zero (0) percent grade.

- (2) Use the theoretical 100-year flood (including considerations for bedload and debris) as design criteria for newly-installed culverts, bridges and other stream crossings. On a case-by-case basis, replace existing culverts posing a substantial risk to riparian conditions with a structure designed for a theoretical 100-year flood and one that meets fish passage requirements, if applicable.
- (3) Minimize the number of crossings on any particular stream.
- (4) Where feasible, design culvert placement on a straight reach of stream to minimize erosion at both ends of the culvert. Design adequate stream bank protection (for example, rip-rap) where scouring would occur. Avoid locations that require a stream channel to be straightened beyond the length of a culvert to facilitate installation of a road crossing.

4. Temporary Stream Crossings

Objective: *To design temporary stream crossings that minimize disturbance of the stream and riparian environment.*

- Practices:**
- (1) Evaluate the advantages and disadvantages of a temporary versus permanent crossing structure for access to the area during all seasons over the long term in terms of economics, maintenance, and resource requirements.
 - (2) Design temporary structures such as pre-fab temporary timber bridges, multiple culverts with minimum fill height, cattleguard crossings, or log cribs to keep vehicles out of the stream.
 - (3) Minimize the number of temporary crossings on a particular stream.
 - (4) Avoid temporary stream crossings on fishery streams during spawning, hatching and migration.

5. Low Water Ford Stream Crossings

Objective: *To design low water fords that minimize disturbance of the stream and riparian environment.*

Practice: Use only when site conditions make it impractical or uneconomical to utilize a permanent or temporary crossing structure.

D. Construction

Objective: *To create a stable roadway while minimizing soil erosion and potential water quality degradation.*

1. Roadway Construction

- Practices:**
- (1) Limit road construction to the dry season (generally between May 15 and October 15). When conditions permit operations at the limits of the dry season, keep erosion control measures current with ground disturbance, to the extent that the affected area can be rapidly closed/ blocked and weatherized if weather conditions warrant.
 - (2) Manage road construction so that any construction can be completed and bare soil can be protected and stabilized prior to fall rains.
 - (3) Confine preliminary equipment access (pioneer roads) to within the roadway construction limits.
 - (4) Construct pioneer roads so as to prevent undercutting of the designated final outslope and prevent avoidable deposition of materials outside the designated roadway limits. Conduct slope rounding at the first opportunity during construction to avoid excess amounts of soil being moved after excavation and embankment operations are completed.

- (5) Use controlled blasting techniques that minimize amount of material displaced from road location.
- (6) Construct embankments, including waste disposal sites, of appropriate materials (no slash or other organic matter) using one or more of the following methods:
 - a. layer placement (tractor compaction),
 - b. layer placement (roller compaction),
 - c. controlled compaction (85 to 95 percent maximum density).

Slash and organic material may remain under waste embankment areas outside the road prism and outside units planned for broadcast burning.

- (7) Avoid sidestepping where it will adversely affect water quality or weaken stabilized slopes. Place excavated material away from Riparian Reserves.
- (8) Place surface drainage prior to fall rains.
- (9) Clear drainage ditches and natural watercourses of woody material deposited by construction or logging above culverts prior to fall rains.

2. Permanent Stream Crossing Construction

- Practices:**
- (1) Confine culvert installation to the low flow period (generally June 15 to September 15) to minimize sedimentation and the adverse effects of sediment on aquatic life.
 - (2) Divert the stream around the work area to minimize downstream sedimentation during construction. After construction, return the stream to its natural channel. Ensure, through proper construction and maintenance, that the stream will remain in its natural channel in the event of crossing failure.
 - (3) Install culverts as close to zero percent slope as possible on fishery streams but not to exceed 0.5 percent. Place culverts in the streambed at the existing slope gradient on larger non-fishery streams. Place energy dissipators (for example, large rock) at the outfall of culverts on small nonfishery streams to reduce water velocity and minimize scour at the outlet end.
 - (4) Countersink culverts 6 to 8 inches below the streambed to minimize scouring at the outlet. Increase culvert diameters accordingly.
 - (5) Limit activities of mechanized equipment in the stream channel to the area necessary for installation.
 - (6) Place permanent stream crossing structures on fishery streams before heavy equipment moves beyond the crossing area. Where this is not feasible, install temporary crossings to minimize stream disturbance.
 - (7) Place rip-rap on fills around culvert inlets and outlets.

3. Temporary Stream Crossing Construction

- Practices:**
- (1) Where possible, limit the installation and removal of temporary crossing structures to once during the same year and within the prescribed work period. Installation and removal should occur during the low flow period (generally June 15 to September 15).
 - (2) Use backfill material that is as soil-free as practicable over temporary culverts. Whenever possible use washed river rock covered by pit run or one inch minus as a compacted running surface.

Appendix B - Wood River Wetland Plan Monitoring

- (3) Spread and reshape clean fill material to the original lines of the streambed after a crossing is removed to ensure the stream remains in its channel during high flow.
- (4) Limit activities of mechanized equipment in the stream channel to the area that is necessary for installation and removal operations.
- (5) Remove stream crossing drainage structures and in-channel fill material during low flow and prior to fall rains. Reestablish natural drainage configuration.

4. Low Water Ford Stream Crossing Construction

- Practices:**
- (1) Restrict construction and use to low flow period (generally June 15 to September 15).
 - (2) Use washed rock/gravel or concrete slab in the crossing.
 - (3) Apply rock on road approaches within 150 feet of each side of the ford to prevent washing and softening of the road surface.

E. Soil Resource Protection

Objective: *To limit and mitigate soil erosion and sedimentation.*

- Practices:**
- (1) Apply protective measures to all areas of disturbed, erosion-prone, unprotected ground, including waste disposal sites, prior to fall rains. Protective measures may include water bars, grass seeding, planting deep rooted vegetation, and/or mulching. Armor or buttress fill slopes and unstable areas with rock which meets construction specifications. Revegetation with native species is preferred, except where overriding concerns to reduce sediment dictate the use of annuals or other quickly establishing species.
 - (2) Use seasonal restrictions on unsurfaced roads.

F. Road Renovation/Improvement

Objective: *To restore or improve a road to a desired standard in a manner that minimizes sediment production and water quality degradation.*

- Practices:**
- (1) Improve flat gradients to a minimum of two percent or provide raised subgrade sections (turnpike) to avoid saturation of the road prism.
 - (2) Reconstruct culvert catchbasins to specifications. Catchbasins in solid rock need not be reconstructed provided water flow is not restricted by soil, rock, or other debris.
 - (3) Identify potential water problems caused by off-site disturbance and add necessary drainage facilities.
 - (4) Identify ditchline and outlet erosion caused by excessive flows and add necessary drainage facilities and armoring.
 - (5) Replace undersized culverts and repair damaged culverts and downspouts.
 - (6) Add additional full-rounds, half-rounds, and energy dissipators as needed.
 - (7) Correct special drainage problems (for example, high water table, seeps) that affect stability of subgrade through the use of perforated drains, geotextiles, or drainage bays.
 - (8) Eliminate undesirable berms that retard normal surface runoff.

- (9) Restore outslope or crown sections.
- (10) Avoid disturbing backslope while reconstructing ditches.
- (11) Surface inadequately surfaced roads that are to be left open to traffic during wet weather.
- (12) Require roadside brushing be done in a manner that prevents disturbance to root systems (such as, avoid using excavators for brushing).
- (13) Prioritize reconstruction and maintenance based on current and potential impacts to Riparian Reserves.

G. Road Maintenance

Objective: *To maintain roads in a manner that protects water quality and minimizes erosion and sedimentation.*

- Practices:**
- (1) Provide basic custodial care to protect the road investment and to ensure minimal damage to adjacent land and resources. Repair erosion in its early stages.
 - (2) Perform blading and shaping to conserve existing surface material, retain the original crowned or outsloped self-draining cross section, prevent or remove rutting berms (except those designed for slope protection) and other irregularities that retard normal surface runoff. Avoid wasting loose ditch or surface material over the shoulder where it can cause stream sedimentation or weaken slump prone areas. Avoid undercutting backslopes.
 - (3) Keep road inlet and outlet ditches, catchbasins, and culverts free of obstructions, particularly before and after winter snowfall and spring runoff. However, hold routine machine cleaning of ditches to a minimum during wet weather.
 - (4) Grading operations are to be conducted to prevent sedimentation and to dispose of surface water without ponding or concentrating water flow in unprotected channels. Schedule grading operations during time periods of the least erosion hazard (generally during the dry season, May 15 to October 15).
 - (5) Retain vegetation on cut slopes and ditches unless it poses a safety hazard or restricts maintenance activities. Cut roadside vegetation rather than pulling it out and disturbing the soil.
 - (6) Inspect areas subject to road or watershed damage during periods of high runoff.

H. Dust Abatement

Objective: *To minimize movement of fine sediment from roads; to prevent introduction into waterways of chemicals applied for dust abatement.*

- Practices:**
- (1) Use dust palliatives or surface stabilizers to reduce surfacing material loss and buildup of fine sediment that may wash off into water courses.
 - (2) Closely control application of dust palliatives and surface stabilizers, equipment cleanup, and disposal of excess material to prevent contamination or damage to water resources.

I. Access Restrictions

Objective: *To reduce road surface damage and therefore minimize erosion and sedimentation.*

- Practices:**
- (1) Barricade or block roads using gates, guard rails, earth/log barricades, boulders, logging debris, or a combination of these methods. Avoid blocking roads that will need future maintenance (that is, culverts, potential slides, etc.) with unremovable barricades. Use guardrails, gates, or other barricades capable of being opened for roads needing future maintenance.
 - (2) Provide maintenance of blocked roads in accordance with design criteria.
 - (3) Install waterbars, cross drains, cross sloping, or drainage dips if not already on road to assure drainage.
 - (4) Scarify, mulch (weed free), and/or seed with native species for erosion control.

Wildfire and Prescribed Fire

A. Prevention

Objective: *To minimize occurrence of severe intensity wildfires in Riparian Reserves, on erosion-susceptible soils, and in high risk watersheds.*

- Practices:**
- (1) Utilize prescribed burning to reduce both natural and activity slash (fuel) adjacent to and/or within these areas.
 - (2) Design fuel treatment and fire suppression strategies, practices, and activities to meet Aquatic Conservation Strategy objectives, and to minimize disturbance of riparian ground cover and vegetation. Strategies should recognize the role of fire in ecosystem function and identify those instances where fire suppression or fuel management activities could be damaging to long-term ecosystem function.
 - (3) Design prescribed burn projects and prescriptions to contribute to attainment of Aquatic Conservation Strategy objectives.

B. Suppression

Objective: *To minimize water quality degradation while achieving rapid and safe suppression of a wildfire.*

- Practices:**
- (1) Use the Soil and Water Resources Impact Evaluation Worksheets during Emergency Fire Situation Analysis to determine appropriate suppression methods.
 - (2) Apply intensive and conditional suppression in high-risk watersheds and conditional suppression in Riparian Reserves. In Riparian Reserves, the goal of wildfire suppression is to limit the size of all wildfires. When watershed and/or landscape analysis, or province-level plans are completed and approved, some natural fires may be allowed to burn under prescribed conditions. Rapidly extinguishing smoldering coarse woody debris and duff should be considered to preserve these ecosystem elements.
 - (3) Locate incident bases, camps, helibases, staging areas, helispots and other centers for incident activities outside of Riparian Reserves. If the only suitable location for such activities is within a Riparian Reserve, an exemption may be given following a review and recommendation by a resource advisor. The advisor will prescribe the location, use conditions, and rehabilitation requirements. Utilize an interdisciplinary team to predetermine suitable incident base and helibase locations.

- (4) Exclude tractors within Riparian Reserves. Limit use of heavy equipment near Riparian Reserves, on slopes greater than 35 percent, and in high-risk watersheds. Where fire trail entry into a Riparian Reserve is essential, angle the approach rather than have it perpendicular to the Riparian Reserve.
- (5) Minimize delivery of chemical retardant, foam, or additives to surface waters. An exception may be warranted in situations where overriding immediate safety imperatives exist, or, following review and recommendation by a resource advisor, when an escape would cause more long-term damage. Apply aerial retardant adjacent to Riparian Reserves by making passes parallel to Riparian Reserves.

C. Rehabilitation

Objective: *To protect water quality and soil productivity with consideration for other resources.*

- Practices:**
- (1) Utilize information from burned area surveys to determine if watershed emergency fire rehabilitation is needed.
 - (2) Develop a fire rehabilitation plan through an interdisciplinary process. Whenever Riparian Reserves are significantly damaged by a wildfire or a prescribed fire burning out of prescription, immediately establish an emergency team to develop a rehabilitation treatment plan needed to obtain Aquatic Conservation Strategy Objectives.
 - (3) Select treatments on the basis of on-site values, downstream values, soil erosion potential, probability of successful implementation, social and environmental considerations (including protection of native plant communities), and cost as compared to benefits.
 - (4) Examples of emergency fire rehabilitation treatments are listed below. Other examples are listed in BLM Manual Handbook 9188-1.
 - ◆ Seed grasses or other vegetation as needed to provide a protective cover as quickly as possible, using native species whenever practicable;
 - ◆ Mulch with weed free straw or other suitable material;
 - ◆ Fertilize;
 - ◆ Place channel stabilization structures;
 - ◆ Construct waterbars on firelines;

D. Prescribed Fire

1. General Guidelines

Objective: *To maintain long-term site productivity of soil.*

Practices: (1) Evaluate the need for burning based on soils, plant community, hazard reduction objectives, site ecology and site preparation criteria. Burn under conditions when a light to moderate-intensity burn can be achieved (see Table B-3) except when ecosystem management objectives dictate achievement of a burn of higher intensity.

(2) Conditions outlined in the Soil Resource Protection section will be met.

Table B-3. Guidelines for Levels of Burn Intensity

Visual Characterization	Site-Specific Results	Proportional Area
Light Burn	Duff, and dead plant material is partly burned.	Less than 2 percent is severely burned. Less than 15 percent is moderately burned.
Moderate burn	Duff, and dead plant material partially to mostly consumed; but mineral soil under the ash is not appreciably changed in color.	Less than 10 percent is severely burned. More than 15 percent is moderately burned.
Severe Burn	Top layer of mineral soil significantly changed in color, usually to reddish color; next 1/2 inch blackened from organic matter charring by heat conducted through top layer.	More than 10 percent is severely burned. More than 80 percent is moderately burned. Remainder is lightly burned.

2. Riparian Reserves

Objective: *To maintain a healthy riparian zone and water quality by minimizing erosion levels within Riparian Reserves.*

Practices: (1) Hand piling and burning will be the preferred fuel treatment within 100 feet of Riparian Reserves. Design prescribed fire projects to contribute to the attainment of Aquatic Conservation Strategy Objectives and to minimize disturbance of riparian ground cover and vegetation.

(2) When an Riparian Reserve is within a burn unit and conditions warrant, only low intensity fire will be prescribed within 100 feet of Riparian Reserves. No intentional ignition will occur within 50 feet of Riparian Reserves except where watershed, wildlife habitat or riparian-wetland enhancement is the objective. Fires will be allowed to "back into" Riparian Reserves as long as a primarily light intensity burn is maintained.

3. Firelines

Objective: *To minimize soil disturbance, soil compaction, soil erosion, and disturbance to Riparian Reserves.*

Practices: (1) Utilize one-pass construction with a brush blade or one edge of a tractor blade to construct tractor firelines, or construct firelines by hand.

(2) No machine constructed firelines in Riparian Reserves.

Livestock Grazing

A. General Guidelines

Objective: *To protect, maintain, or improve water quality, riparian-wetland areas and upland plant communities; to achieve properly functioning riparian ecosystems.*

- Practices:** (1) Monitor, evaluate and adjust grazing practices to eliminate impacts that retard or prevent attainment of Aquatic Conservation Strategy objectives. If adjusting practices is not effective, eliminate grazing in the area.
- (2) Consider fencing springs, seeps, and water developments to protect water quality and riparian ecosystems. Pipe overflow away from the developed source area to minimize contamination.
- (3) Locate livestock water developments away from riparian and wetland areas. Conditions outlined in the Water Source Development and Use section will be met.
- (4) Resolve management conflicts or concerns regarding water quality and/or watershed/riparian-wetland area condition through the development of grazing management plans. Modify current grazing management practices through allotment management plans, coordinated resource management plans, agreements or decisions, as needed.
- (5) Promote ecological recovery through appropriate forage utilization levels, improved livestock distribution and management through fencing, vegetation treatments, water source development, and/or changes in season of use or livestock numbers.
- (6) Cooperate with federal, tribal, and state wildlife management agencies to identify and eliminate wild ungulate impacts that are inconsistent with attainment of Aquatic Conservation Strategy objectives.

B. Grazing Management in Riparian-Wetland Areas

Objective: *To achieve properly functioning riparian-wetland ecosystems.*

- Practices:** (1) Conduct grazing management practices to provide for regrowth of riparian-wetland vegetation or leave sufficient vegetation after use for maintenance of proper functioning condition. See the Definitions and Proper Functioning Condition section for instructions on determining proper functioning condition.
- (2) Develop grazing strategies for riparian-wetland areas using one or more of the following features. This grazing strategy would be developed at the activity planning level, through an allotment evaluation and the development of an allotment management plan:
- ◆ inclusion of the riparian-wetland area within a separate pasture with separate management objectives and strategies;

- ◆ fencing or herding of livestock out of riparian-wetland areas for as long as necessary to allow vegetation to recover;
 - ◆ controlling the timing of grazing to keep livestock off streambanks when they are most vulnerable to damage and to coincide with the physiological needs of target plant species;
 - ◆ adding more rest to the grazing cycle to increase plant vigor, allow streambanks to heal, or encourage more desirable plant species composition;
 - ◆ limiting grazing intensity to a level which will maintain desired species composition and vigor;
 - ◆ changing from cattle to sheep to obtain better animal distribution through herding;
 - ◆ permanently excluding livestock from those riparian-wetland areas that are at high risk and have poor recovery potential, and when there is no practical way to protect them while grazing adjacent uplands.
- (3) Incorporate allowable use guidelines for riparian-wetlands in allotment management plans as part of a grazing strategy. Allowable use of forage is based on the amount of forage that will be left at the end of the overall grazing season or the end of the growing season, whichever is later. These guidelines would generally follow the utilization standards shown in Table B-4, which include cumulative annual use by wild ungulates and livestock:

Table B-4. Utilization Standards in Riparian-Wetland Areas.

	Proper Functioning Condition		Functional - At Risk or Nonfunctioning	
	Herbaceous	Woody	Herbaceous	Woody
Riparian Areas with Management	50	50	0-40	0-35
Riparian Areas without Management	40	30	0-30	0-25

In addition to these allowable use guidelines, grazing would be scheduled to allow at least 30 days of post-grazing regrowth annually. The allotment management plans could include utilization standards which are either lower or higher than those outlined above, or could prescribe late season use of riparian vegetation. This prescription could occur when associated with intensive grazing systems and specific vegetation management objectives that meet the needs of riparian-dependent resources.

Watershed Rehabilitation

Objective: *To increase soil stability, reduce soil erosion, and improve water quality.*

Practices: (1) Design and implement watershed restoration projects in a manner that promotes long-term ecological integrity of ecosystems, conserves the genetic integrity of native species, and attains Aquatic Conservation Strategy Objectives. Employ good project planning using an interdisciplinary team. Recent BLM policy provides direction and guidance for the development of restoration projects, and should be incorporated.

- (2) Use corrective measures to repair degraded watershed conditions and rehabilitate with a native (where practicable) vegetative cover that will maintain or improve soil stability, reduce surface runoff, increase infiltration, and reduce flood occurrence and flood damages. Do not use mitigation or planned restoration as a substitute for preventing habitat degradation.
- (3) Consider partnerships or the use of cooperative agreements to coordinate efforts with adjacent landowners. Develop watershed-based Coordinated Resource Management Plans to meet Aquatic Conservation Strategy Objectives.
- (4) Where feasible, rehabilitate headcuts and gullies on watershed uplands.
- (5) Improve native perennial grass cover conditions or wildlife habitat using treatment projects such as juniper control, brush control or prescribed fire. Design projects so that adequate soil cover remains; an adequate herbaceous seed source or seed bed is available (either naturally or through seeding); wildlife habitat is either maintained or enhanced; and ensure that subsequent management of the site addresses livestock and recreation use, or other management-caused limiting factors. Watershed improvement projects are to be designed to meet the long term goals of this plan; however, in the short-term these conditions may be exceeded in order to achieve watershed improvement objectives.

Fisheries Habitat Improvement Projects

Objective: *To minimize damage to streambanks and riparian habitat during construction of fishery habitat improvement projects.*

- Practices:**
- (1) Design and implement fish and wildlife habitat restoration and enhancement activities in a manner that contributes to attainment of Aquatic Conservation Strategy objectives.
 - (2) Carefully plan access needs for individual work sites within a project area to minimize exposure of bare soil, compaction, and possible damage to tree roots. Utilize existing trails to the extent practical.
 - (3) Base design of habitat improvement structures on state-of-the-art techniques and local stream hydraulics.
 - (4) Confine work in the stream channels to between June 15 and September 15 (during the low flow period) to minimize the area of the stream that would be affected by sedimentation.
 - (5) Keep equipment out of streams to extent possible.
 - (6) Limit the amount of streambank excavation to the minimum necessary to ensure stability of enhancement structures. Place excavated material as far above the high water mark as possible to avoid entry into the stream.
 - (7) Whenever possible obtain logs for habitat improvement structures from outside the riparian zone or at least 200 feet from the stream channel to maintain integrity of riparian habitat and streambanks.
 - (8) Inspect all mechanized equipment daily to help ensure toxic materials such as fuel and hydraulic fluid do not enter the stream.
 - (9) Utilize waterbars, barricades, and seeding to stabilize bare soil areas.

Recreation and Off-Highway Vehicle Use

Objective: *To minimize damage to streambanks and riparian habitat and impacts to water quality and soil productivity from off-highway vehicles and other recreation use.*

- Practices:**
- (1) Minimize resource damage from off-highway vehicle use. Where off-highway vehicle use is causing resource damage, restrict or prohibit such use. Prohibit vehicle and off-highway vehicle use (except for boats) in fish bearing and perennial streams, lakes, ponds and other waters, on sensitive stream banks, and, during wet soil conditions, in Riparian Reserves.
 - (2) Design, construct, and operate recreation facilities, including trails and dispersed sites, within Riparian Reserves in a manner that contributes to attainment of Aquatic Conservation Strategy Objectives. For existing recreation facilities inside Riparian Reserves, evaluate and mitigate impacts to ensure that these do not prevent, and to the extent practicable contribute to, attainment of Aquatic Conservation Strategy Objectives. Implement erosion control measures on all administrative sites and on developed recreation sites to stabilize the soil and minimize stream sedimentation.
 - (3) Adjust dispersed and developed recreation practices that retard or prevent attainment of Aquatic Conservation Strategy Objectives. Where adjustment measures such as education, use limitations, traffic control devices, increased maintenance, relocation of facilities and/or specific site closures are not effective, eliminate the practice or occupancy.
 - (4) Design facilities to concentrate and direct foot and vehicular traffic to reduce impacts. Apply site-hardening measures appropriate for the level of designed development. However, in areas with concentrated recreation use, requirements outlined in the Soil Resource Protection section may be exceeded, provided that State and Clean Water Act requirements are met.
 - (5) Design, construct and operate fish and wildlife interpretive and other user-enhancement facilities in a manner that does not retard or prevent attainment of Aquatic Conservation Strategy objectives. For existing fish and wildlife interpretive and other user-enhancement facilities inside Riparian Reserves, ensure that Aquatic Conservation Strategy objectives are met. Where Aquatic Conservation Strategy objectives cannot be met, relocate or close such facilities.

Objective: *To provide safe drinking water to administrative facilities and recreation sites.*

- Practices:**
- (1) Environmental Protection Agency Drinking Water Standards and State and local Health Departments provide the standards and administrative guidelines for drinking water supplies. These agencies will be used as a source of information and technical assistance.
 - (2) The District Engineer serves as the District Drinking Water Coordinator and is responsible for coordinating a testing program to ensure that tests are performed on water systems in accordance with applicable laws and regulations. The District Drinking Water Coordinator also prepares reports of test results for district water systems and maintains records of monitoring, treatment, and laboratory test results. Bureau-operated water systems are managed in accordance with BLM Manual 9184: Drinking Water Supply.

Objective: *To protect surface and subsurface water from bacteria, nutrients, and chemical pollutants resulting from the collection, transmission, treatment, and disposal of sewage and solid waste at administrative facilities and recreation sites.*

- Practices:**
- (1) The District Engineer is responsible for the day-to-day operation, monitoring and maintenance of wastewater treatment facilities, including septic systems and toilets at recreation facilities. Guidance for this program is outlined in BLM Manual 9182: Wastewater Treatment.

- (2) Plan, locate, design, construct, operate, inspect, and maintain sanitation facilities and refuse disposal sites to minimize the possibility of water contamination. Consult State and local authorities to assure compliance with all applicable State and local regulations. Educate the public in proper sanitation practices and refuse disposal at each site through the use of signs, printed information, mass media, and personal contact.

Management of Competing Vegetation (Not Including Noxious Weeds): Use of Herbicides

Objective: *To protect water quality and public health and safety.*

Practices: (1) Herbicides, insecticides, and other toxicants, and other chemicals shall be applied only in a manner that avoids impacts that retard or prevent attainment of Aquatic Conservation Strategy objectives.

- (2) Notify residents and adjacent landowners within 0.5 mile of proposed treatment sites who likely could be directly affected by chemical drift, smoke, food or water contamination, or an accidental spill prior to any chemical application.
- (3) Use the buffer strips widths in Table B-1 on perennial and fish bearing streams, and on all lakes, ponds and other waters:

Local conditions may require an expansion of these minimum widths. Some examples of site-specific factors that may necessitate additional buffer widths include: mode of transport (direct application, drift, and water flow); adjacent topography; and buffer vegetation structure and functions.

- (3) Assign 100-200 foot buffers in areas having shallow water tables or where aquifers are located in alluvial deposits along major streams when using atrazine, a persistent chemical.

Noxious Weed Control

Objective: *To protect water quality, public health and safety, and soil productivity.*

Practices: (1) Herbicides, insecticides, and other toxicants, and other chemicals shall be applied only in a manner that avoids impacts that retard or prevent attainment of Aquatic Conservation Strategy objectives.

- (2) **Biological Control:** If grazing by goats or sheep is used, allowable use guidelines may be exceeded in order to accomplish control or eradication objectives. Adherence to these guidelines will be analyzed on a site-specific, case-by-case basis.
- (3) **Manual/Mechanical Control:** Tillage will be allowed on slopes that do not exceed 10 percent. Controlled burning may be used if the burned area can be rehabilitated to prevent erosion and resource degradation. Guidelines in Section IV may be exceeded in order to accomplish control or eradication objectives. Adherence to these guidelines will be analyzed on a site-specific, case-by-case basis.
- (4) **Chemical Control:** Herbicides labeled for aquatic use in the control of riparian-wetland or aquatic weeds could be used as described in the *Northwest Area Noxious Weed Control Environmental Impact Statement (1987)*. For all other herbicides, use the buffer strips widths in Table B-5 on perennial and fish bearing streams, and on all lakes, ponds and other waters:

Table B-5. Application Technique.

	<u>Minimum Buffer Width¹</u>
Manual wipe-on	High Water Mark
Manual	10 feet
Vehicle	50 feet
Aerial (Perennial and Fish Bearing Streams)	100 feet
Aerial (Lakes, ponds, and other waters)	200 feet
Aerial (in drainages with domestic water diversions)	200 feet

¹All surface waters, unless otherwise indicated.

Table B-6. Application Technique.

	<u>Minimum Buffer Width¹</u>
Manual wipe-on	Existing High Water Line
Spot Treatment by Ground vehicle with handguns or with backpacks	10 feet
Granular Formations	10 feet
Ground Vehicle with Boom Sprayers	25 feet
Aerial (All surface waters and identified ground water recharge areas)	100 feet

¹All surface waters.

Local conditions may require an expansion of these minimum widths. Some examples of site-specific factors that may necessitate additional buffer widths include: mode of transport (direct application, drift, and water flow); adjacent topography; and buffer vegetation structure and functions.

Water Source Development and Use

Objective: To supply water for various resource programs while protecting water quality and riparian vegetation.

- Practices:**
- (1) Locate water drafting sites to minimize adverse effects on stream channel stability, sedimentation, and in-stream flows needed to maintain riparian resources, channel conditions, and aquatic habitat.
 - (2) **Water Rights and Permits** All proposed water source developments will have appropriate water rights documentation completed prior to construction, in accordance with Oregon State water laws. The District Engineer will be consulted during the planning process for proposed developments in order to initiate filing for permits and water rights documentation.
 - (3) Design and construct durable, long-term water sources. Avoid reduction of downstream flow which would detrimentally affect aquatic resources, fish passage, or other uses.
 - (4) Direct overflow from water-holding developments back into the stream.
 - (5) Locate road approaches to instream water source developments so as to minimize potential impacts in riparian-wetland areas. Apply rock to surface of these approaches to reduce the effects of sediment washing into the stream.
 - (6) Avoid use of road fills for water impoundment dams unless specifically designed for that purpose. Remove any blocking device prior to fall rains.
 - (7) Construct water sources during the dry season (generally between May 15 and October 15).
 - (8) Standards and guidelines for water developments are outlined in BLM Manual Handbook 1741-2, *Water Developments*.
 - (9) **Use of Existing Developments** Use of water in existing developments must be in accordance with the allowed use of that water as stated in the water right for that development. Any use, except for emergency fire suppression, that is outside of the permitted amounts or type of use (as specified by a Certificate of Water Right) must be covered under a Limited License to Use Surface Water, which is issued by the State. The District Engineer will be consulted prior to the anticipated need for the use of water to determine if the proposed use is in accordance with water rights. If not, then an application for a Limited License to Use Surface Water will be filed by the District Engineer.

Erosion Control Practices

See BLM Manual Handbook 9188-1.

Definitions and Proper Functioning Condition

Definitions

Wetland: Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support and which, under normal circumstances, do support a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands include marshes, shallow swamps, lake bogs, muskegs, wet meadows, estuaries, and riparian areas. (33 Code of Federal Regulations 323)

Riparian Area: A form of wetland transition between permanently saturated wetlands and upland areas. These areas exhibit vegetation of physical characteristics reflective of permanent surface or subsurface water influence. Lands along, adjacent to, or contiguous with perennially and intermittently flowing rivers and streams, glacial potholes, and the shores of lakes and reservoirs with stable water levels are typical riparian areas. Excluded are such sites as ephemeral streams or washes that do not exhibit the presence of vegetation dependent upon free water in the soil.

Lotic: Characterized by running water habitat, as in rivers, streams and springs.

Lentic: Characterized by standing water habitat, as in lakes, ponds, seeps, bogs and wet meadows.

Perennial Stream: A stream that typically has running water on a year-round basis.

Intermittent Stream: Any non-permanently flowing drainage feature having a definable channel and evidence of annual scour or deposition. This includes what are sometimes referred to as ephemeral streams if they meet these two physical criteria. As a guideline, an intermittent stream will flow at least 30 days every six out of 10 years.

Many intermittent streams may be used as spawning and rearing streams, refuge areas during flood events in larger rivers and streams, or travel routes for fish emigrating from lakes. In these instances, the standards and guidelines for fish-bearing streams would apply to those sections of the intermittent used by any species of fish for any duration.

Detrimental Compaction: Detrimental soil compaction occurs at depths greater than two inches and is evidenced by: an increase in soil bulk density of 15 percent or more over the undisturbed level; and/or a macropore space (pores over 0.038 millimeters) reduction of 50 percent or more.

Determination of Riparian-Wetland Area Condition

Recent Bureau of Land Management, Oregon State Office guidance states that during inventory and monitoring of riparian areas, an assessment of riparian-wetland area status in terms of functioning and ecological condition should be incorporated. This information should be included in allotment management plans and other planning documents. Current condition of riparian-wetland areas is placed into one of the following functional categories.

Proper Functioning Condition: Riparian-wetland areas are functioning properly when adequate vegetation, landform, or large woody debris are present to dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality; filter sediment, capture bedload and aid floodplain development; improve floodwater retention and groundwater recharge; develop root masses that stabilize streambanks against cutting action; develop diverse ponding and channel characteristics to provide the habitat and the water depth, duration and temperature necessary for fish production, waterfowl breeding, and other uses; and support greater biodiversity. The functioning condition of riparian-wetland areas is a result of the interaction among geology, soil, water and vegetation.

Functional-At Risk: Riparian-wetland areas that are in functional condition but an existing soil, water, management or vegetation attribute makes it susceptible to degradation.

Non-Functional: Riparian-wetland areas that clearly are not providing adequate vegetation, landform, or large woody debris to dissipate stream energy associated with high flows, and thus are not reducing erosion, improving water quality, etc., as listed above. The absence of certain physical attributes, such as having a floodplain where one should be, are indicators of non-functioning conditions.

Along with functioning condition, BLM expresses the status of riparian-wetland areas in ecological terms. In many cases, riparian-wetland areas will provide functional benefits if they are in the late seral to potential plant community stage. Therefore, BLM has the general goal of achieving advanced ecological status in riparian-wetland areas, except where resource management objectives would require an earlier successional stage. For example,

vegetation diversity may not occur at the potential plant community stage. Through site-specific activity plans, determine the most desirable riparian-wetland community for meeting management objectives.

A Technical Reference 1737-9, *Process for Assessing Proper Functioning Condition*, discusses how to assess condition and gives the following guidelines for determining desired future condition:

1. Determine existing condition.
2. Determine potential condition.
3. Determine the minimum conditions to reach proper functioning condition.
4. Determine management goals for the watershed (that is Desired Plant Community or Desired Future Condition).
5. Negotiate specific objectives to reach management goals.
6. Design management actions.
7. Determine monitoring needs.
8. Provide enough flexibility to change management actions based upon monitoring results.

The amount of time spent in these steps would depend on the riparian and riparian-dependent resources involved, and what kinds of information are available. When possible, Ecological Site Inventory information should be gathered on certain riparian areas in order to make judgements. Otherwise, use existing inventory and monitoring information and professional, interdisciplinary judgement.

Riparian-Wetland Reference Tools

The BLM has developed a series of handbooks to assist in the management of riparian-wetland areas, and are listed below.

Technical Reference TR-1737-1: *A Selected, Annotated Bibliography of Riparian Area Management*

Technical Reference TR-1737-2: *The Use of Aerial Photography to Inventory and Monitor Riparian Areas*

Technical Reference TR-1737-3: *Inventory and Monitoring of Riparian Areas*

Technical Reference TR-1737-4: *Grazing Management in Riparian Areas*

Technical Reference TR-1737-5: *Riparian and Wetland Classification Review*

Technical Reference TR-1737-6: *Management Techniques in Riparian Areas*

Technical Reference TR-1737-7: *Procedures for Ecological Site Inventory- With Special Reference to Riparian-Wetland Sites*

Technical Reference TR-1737-8: *Greenline Riparian-Wetland Monitoring*

Technical Reference TR-1737-9: *Procedures for Assessing Proper Functioning Condition*

Table B-7. Guide for Placing Common Soil and Geologic types into Soil Erosion and Soil Infiltration Classes to Space Lateral Road Drainage Culverts

Representative Soil Series type	721	729	380	719	706	718	381				
Erosion Class	I	II	III	IV	V	VI	VII	VIII	IX	X	
Erosion Index	10	20	30	40	50	60	70	80	90	100	
Standard Soil Textures and Unified System Soil Groups	SM	SM	Silt (unconsolidated) (B)	Silt (consolidated) (B)	Silty clay loam (A)	Clay loam (A)	Loamy sand (C)	Course sand (C)	Fine gravel	Rock (C)	
	ML	ML	OL	OL	Silty Clay (A)	Silt Loam (A,B)	Sandy loam (B)	SW	SW	Cobble (C)	
			MH	MH	Clay, varying with type, cohesiveness & compaction (A)	Clay, varying with type, cohesiveness & compaction (A)		SP	SP	Gravel (C)	
				CL	Sandy clay (B)	Sandy clay loam (B)	Sand (B,C)	Sand (B,C)		GW,GP	
					SC,GM OH,CH	CH,GM	GC				
Special Cases: General Names & Descriptions	Decomposed grandiorite (C)	Decomposed sandstone, e.g., (B,C)	Fine soils derived from rocks high in mica (C)	Coarse soils derived from rocks high in mica (C)	Some volcanic ash or extremely fine pumice sometimes difficult to distinguish from residual soils (B)					Fractured loose basalt or shale (C)	
	High decomposed granite (B)	Greasy decomposed rock high in clay (A)								"Shot" as found in Coarse volcanic cinders (C)	
			Pumice, varying with location, particle size, density, topography, and compaction (B,C)							Bed rock (A)	

Table B-8. Guide for Maximum Spacing (in feet) of Lateral Drainage Culverts by Soil Erosion Classes and Road Grade (2 percent to 18 percent)

Road Grade in Percent	Erosion Class	I	II	III	IV	V	VI	VII	VIII	IX	X
	Erosion Index	10	20	30	40	50	60	70	80	90	100
2		900	1225								
3		600	815	1070	1205						
4		450	610	800	905	1015					
5		360	490	640	725	810	865	1000			
6		300	410	535	605	675	720	835	1010		
7		255	350	455	515	580	620	715	865	1030	1210
8		225	305	400	450	505	540	625	755	900	1055
9		200	270	355	400	450	480	555	670	800	940
10		180	245	320	360	405	435	500	605	720	845
11		165	220	290	330	370	395	455	550	655	770
12		150	205	265	305	340	360	415	505	600	705
13		140	190	245	280	310	335	385	465	555	650
14		130	175	230	260	290	310	355	430	515	605
15		120	165	215	240	270	300	335	405	480	565
16		115	155	200	225	255	280	310	380	450	530
17		105	145	190	215	240	265	295	355	424	500
18		100	135	180	200	225	250	280	335	400	470
19 to 40	Jeep Roads	50	50	50	90	90	90	90	90	90	90
	Skid Roads										

This table is based on rainfall intensities of 1 to 2 inches per hour falling in a 15-minute period with an expected recurrence interval of 25 years. For areas having intensities other than 1 to 2 inches per hour, divide values in the table as follows:

Rainfall Intensity	Divisor
2-3 inches per hour	1.50
3-4 inches per hour	1.75
4-5 inches per hour	2.00
Less than 1 inch per hour	Whatever the intensity (.75, .85, etc.)

Ref: Transportation Engineering Handbook, U.S. Forest Service, R-6, 1966.

Notes: In soils producing high sediment yields such as the 721, 729, and 300 series, the spacings should be considered as maximum distances between drainage structures. 300 feet to 400 feet to gradients of 4 to 10 percent in these soils was found to be the average spacing that provided fair ditchline protection.

Appendix C Water Resources, Wetland/Riparian Area Functions

Introduction

When analyzing the environmental effects of Alternatives B, C, and D, it is important to understand the effects of different wetland types on water quantity and water quality. Then, depending on the type and extent of the wetland(s) that would be created by each alternative, a comparison can be made for impacts expected under the No Action Alternative (continuation of current management). This appendix will discuss some fundamental concepts to provide a basic understanding of the effects of various wetland types on water quality and quantity.

In general terms, wetlands are lands where water is the dominant factor determining the nature of soil development and the types of plant and animal communities living in or above the soil surface. The one feature that most wetlands share is soil or substrate that is at least periodically saturated with or covered by water during part of the active growing season. Wetlands are lands that are transitional between terrestrial and aquatic systems (USFWS 1992b).

Riparian areas are those terrestrial areas where the vegetation and the microclimates are the products of the presence and/or influence of perennial and/or intermittent water (see glossary). Specific to the Wood River property, these areas are associated with the streambanks of the Wood River and Sevenmile Creek, and the banks of man made ditches and levees. These areas are included in the US Fish and Wildlife classification system as wetlands.

Wetlands are dynamic ecosystems. Because wetlands are an intermediate stage between truly terrestrial and truly aquatic systems, a change in water level will result in a shift of the wetland towards one or the other of these states. However, although there are documented cases of long-term stability or even a shift to a more aquatic state, the general direction of wetland succession is toward a reduction in water level and a change to the drier state (Howard-Williams 1985).

Natural changes in water level in a wetland can be brought about by autogenic or allogenic processes. Autogenic processes are those caused by the growth of the wetland plants themselves, and the allogenic processes are caused by external factors. For example, litter deposition raising the bed of the wetland would be autogenic, and erosion or precipitation of incoming suspended material in throughflow waters would be allogenic. Normally however, wetland succession involves a complex interplay of both autogenic and allogenic processes. The latter clearly modify the former and in many cases external factors such as fires, drawdowns, or floods can maintain a wetland at an apparently stable state for long periods of time (Howard-Williams 1985).

The U.S. Fish and Wildlife Service has developed and adopted a wetland and deepwater habitat classification system. This system, outlined in the publication *Classification of Wetlands and Deepwater Habitats of the United States* (USFWS 1992b), describes ecological taxa (see Glossary), arranges them into a system useful to resource managers, and provides uniformity of concepts and terms. Other agencies, including the Bureau of Land Management, use this system for classification of wetlands.

Wetland Hydrology

The hydrology of wetland systems influences plant species and their succession, soil development and chemistry, and water quality.

"By definition, all wetlands are created and maintained by water. The frequency, depth, and duration of the water's influence determine, to a significant extent, the vegetation present and the functions that the wetland provides. Water, whether from a surface water source or from groundwater, is the most critical feature to define and evaluate in attempting to reproduce a naturally occurring wetland system.

In order to create a wetland system which provides specific functions, one specific hydroperiod or range of hydroperiods is often most effective or desirable. A hydroperiod is defined as the periodic or regular occurrence of flooding and/or saturated soil conditions" (Marble 1992).

Numerous hydrologic processes may be interacting at any given time in a wetland area. A water budget (a mathematical description of the hydrologic processes of a wetland) assessing the inflow, outflow, and storage of a wetland for a specific time period can be critical to understanding and quantifying the hydrologic processes influencing a particular wetland. The magnitude and duration of seasonal water level changes are important because they directly influence the chemical and biological processes in a wetland. These changes can also be diverse and relatively complex (Strickland 1986). Once a water budget is developed for a wetland, it can be used to determine which functional processes will dominate a particular wetland and the effects of those processes on water quality and quantity.

Surface Flow

Most water movement in wetlands is by surface flow, because subsurface flow rates are restricted by saturated soil conditions. Surface water often enters a wetland system in the form of channelized or overland flow. Once the water enters the wetland, this surface flow becomes sheet flow. Sheet flow occurs because wetlands lack channels, and force the water to take a tortuous route through the surface vegetation (Stednick 1988).

Wetlands have the ability to alter floodwaters and attenuate flood peaks. Flood alteration is the process by which peak flows from runoff, surface flow, and precipitation are stored or delayed. Wetlands, as well as upland areas, act to detain flood waters by intercepting sheet flow and flood waters. By lowering flood peaks, wetlands act to decrease flood-related damage. The importance of a wetland in altering floodflows depends to a great extent on its position in the watershed and its outlet characteristics. The magnitude of attenuation is a function of the wetland's floodwater storage capacity and outlet discharge capacity relative to the magnitude and volume of the inflow flood (Strickland 1986).

Another function attributed to wetlands is the "desynchronization" of flood peaks. Desynchronization occurs when, at some point of interest downstream of the wetland, the flood peak discharge from the wetland does not coincide with the peak discharge from other tributary drainage areas of the watershed. In other words, the flood peak discharge from the wetland is delayed in comparison to what would have occurred had the wetland not been present (Strickland 1986).

Characteristics of Wetlands that Maximize Flood Alteration Benefits

In general, riparian and freshwater impounded wetlands are more efficient at attenuating "typical" flood events (that is, the two- to five-year event). They become less efficient as the magnitude of the inflow flood increases (Strickland 1986). Wetlands with more vegetation than open water are more capable of altering floodflows. The vegetation slows floodwaters by creating frictional drag in proportion to stem density. Channel roughness (see Glossary) and thus the ability to retain floodwater increases with increasing vegetation density. Because the effect of vegetational resistance rapidly diminishes as the water depth becomes greater than the

height of the vegetation, sheet flow, rather than channel flow, is altered the most. Wetlands with a low gradient and a basin morphology that allows water to spread out rather than remain in a channel, such as the Wood River property, will lend itself to sheet flow conditions (Marble 1992).

Groundwater

Wetlands can raise the groundwater table immediately adjacent to them, and can stabilize groundwater flow by reducing seasonal fluctuations (Hensel and Miller 1991). Wetlands recharge groundwater by holding surface water long enough to allow the water to percolate into the underlying sediments and/or bedrock aquifers. Once the water reaches the groundwater system, it aids in augmenting low flow of surface water streams and lakes. The magnitude of the recharge effect is dependent upon the location of the underlying groundwater table and the porosity of the soil and bedrock that allows drainage to the underlying groundwater system. Wetland systems buffer against extreme seasonal fluctuations in groundwater levels. The mass of soil and vegetation associated with wetlands acts as a sponge, soaking up water during wet cycles and releasing it during drier times. The extent of such buffering is a function of the hydraulic properties of the soil and groundwater flows.

Characteristics of Wetlands that Maximize Groundwater Benefits

Wetlands underlain by permeable soils with high infiltration rates are more likely to recharge groundwater. Organic soils and clays may not transmit water rapidly enough to be effective in recharging groundwater or may create a barrier, preventing surface water from percolating to groundwater. Features that allow water to rapidly flow out of a wetland, including channels, levees, ditches, canals, or similar types of drainage features also reduce the opportunity for water to percolate into the underlying substrate. Soils that are seasonally or temporarily flooded are more likely to transmit water than saturated soil. This occurs when fluctuating water levels in a wetland periodically inundate adjacent unsaturated soils (Marble 1992).

Function of Wetlands in Relation to Water Quality

Surface water quality characteristics most influenced by wetland systems are suspended sediment, macronutrients (nitrogen and phosphorus), and heavy metals (including micronutrients).

Sediment

Water moving through a wetland carries suspended soil particles and particulate organic matter, collectively called sediment. Sediment trapping is defined as the process by which particulate matter is deposited and retained within a wetland. There are some general properties that may be applied to all wetlands with respect to their ability to trap sediments. The velocity of the water must be fast enough to transport sediment to the wetland and then slow enough through the wetland to allow the sediment to settle out of the water. The residence time of the water is the length of time it remains in the wetland. As the residence time increases so does the proportion of the sediment load that will be deposited in the wetland. Generally, long residence times are necessary to allow the clay fraction of the sediment load to settle out of the water column. Available sediment refers to the amount of sediment that is transported to the wetland. If more sediment is brought to the wetland than can be transported away, then the sediment will accumulate there. On the other hand, if there is only a small source of sediment there will be little accumulation (Strickland 1986).

As the age of a wetland increases, the sediment accretion rate decreases. Wetland systems that have been subject to sediment-laden waters for several years, or have large sediment deposits, may eventually become less effective in trapping sediments. This loss of efficiency can be caused by changes in vegetation which results in less energy dissipation. Or, when runoff waters become channelized by deposited sediments, the energy of the water increases which allows more sediment to be retained in the water column (Stednick 1988). The base level of a wetland is the level above which there can be no deposition. For riverine-associated wetlands the base level

is the height of water during flooding. As the level of the sediment-water interface approaches base level, the wetland will experience decreased vertical growth and start to accumulate horizontally, if conditions permit (Strickland 1986).

Characteristics of Wetlands that Maximize Sediment Deposition

Because sediment retention times are generally shortest in riverine wetlands and flooding events frequently erode bottom sediments, lacustrine (lake) or palustrine (swamp) wetland systems are more effective at retaining sediment. Riverine systems may carry large quantities of suspended sediments and associated toxicants. A wetland in a wind-sheltered area where the adjacent topographic relief is sufficient or adequate vegetation breaks exist to protect the site will be less prone to wind mixing, which encourages the suspension and transport of sediments out of the wetland. Wetlands with shallow water (less than 40 inches depth) favor vegetation growth. Extensive stands of vegetation offer frictional resistance to water flow and enhance sedimentation. Wetland vegetation also reduces the resuspension of bottom sediments from wind mixing and lengthens the flow pattern of water through the wetland. Wetland vegetation also contributes to the organic content of the bottom sediments which, in turn, helps retain toxicants associated with sediments. Persistent wetland vegetation species are desirable because they remain standing through the winter season and function to remove sediment throughout the year (Marble 1992).

There are three aspects of wetland plants that influence the amount of organic material they produce and deposit as detritus: productivity, nitrogen-fixing ability, and the capacity for physical dispersal. Aquatic bed species generally are the most productive, since they can transfer nutrients from the sediment to the water column and they decompose more rapidly than other vegetation forms. Emergent vegetation is also highly productive, more so than woody vegetation (Marble 1992). Plant detritus is decomposed and transported at different species-specific rates. A variety of vegetation classes will therefore make production export rates more balanced throughout the year.

Nutrients

Marble (1992) states the following on nutrients:

"Wetlands can improve water quality by removing nutrients. Nutrients can be removed from both the water column and sediments during the growing season. On a short-term basis, nutrients can be taken up and stored by wetland vegetation. Once the plants die or defoliate, the nutrients are returned to the water and sediment. Nutrients may be removed by physically burying the sediments (organic and inorganic) to which they are attached. Sediments carry nutrients through absorption and adsorption. Sediment particles are removed by dense wetland vegetation which slows the flow of sediment-laden water. The slower the water velocity, the greater the setting of sediments from the water column and thus the increase of nutrient burial.

Several chemical and microbial processes also function to remove or transform nutrients. De-nitrification results in the permanent loss of nitrogen from a wetland. De-nitrification is the conversion of dissolved nitrogen to gaseous nitrogen by microbes in anaerobic conditions. Nitrogen fixation involves the conversion or fixation of gaseous nitrogen into inorganic forms by bacterial and blue-green algae. Ammonium volatilization is an abiotic process which results in the removal of ammonium by evaporation. The process occurs at high temperatures and at a pH of greater than 7.5. A relatively minor mechanism for nitrogen removal is biotic in nature. Seasonal emergence of aquatic insects and consumption of nutrient rich aquatic plants by waterfowl or livestock may result in seasonal and sometimes permanent losses of nitrogen from wetlands. Phosphorus is immobilized in wetland sediments through adsorption and precipitation."

When a wetland becomes the recipient of waters with higher nutrient content than those it normally experiences, there is response in the vegetation. Increases in nitrogen and phosphorus delivery to a wetland can cause biomass expansion and changes in plant species composition and/or relative abundance. The increased availability of nutrients produces more vegetation during the growing season, which in turn means more litter during the non-growing season. This litter requires several years to decay, and hence the total pool of living and dead

material grows slowly over several years to a new and higher value. A portion of this litter becomes new organic soil. Such organic sediments can be good sorbents for a number of dissolved constituents. The accretion of soils and sediments thus contributes to the effectiveness of a wetland for water quality improvement (Kedec and Alvord 1989).

Litterfall, when coincident with high or peak flows, may result in a net release of plant essential nutrients from a wetland. Litterfall alone may result in plant essential nutrient releases if outputs are greater than inputs and litterfall mass overrides decomposition rates (Stednick 1988). In low-lying areas of a wetland, water may be stagnant except during peak runoff periods. This water may have nitrogen, phosphorus, and other constituents leach into it from decaying plants or other debris. Overflow from and through these areas during runoff events may then contribute large quantities of dissolved and suspended material to downstream waters.

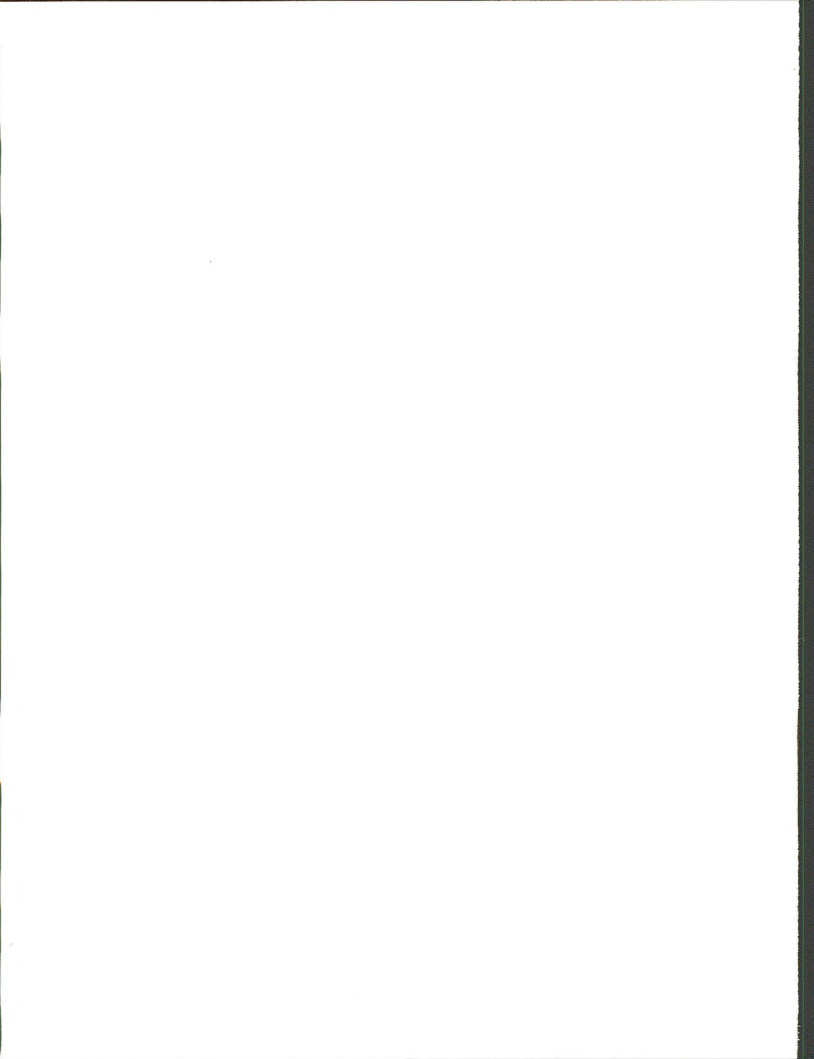
Both the hydrology and the uptake of nutrients by wetland vegetation can vary seasonally. Seasonal variability of nutrient cycling in freshwater wetlands can be attributed to timing and duration of water renewal; sediment and water nutrient concentrations; anaerobic conditions; duration of ice cover; death of vegetation; and the length of the growing season (Strickland 1986). Seasonality affects the ability of a wetland to act as a nutrient sink. With the onset of the growing season and increased plant uptake, dissolved nutrient concentrations decline. As summer progresses the water levels fall which allows greater aeration of the sediments. Aeration decreases the solubility of phosphorous and decreases de-nitrification, both of which serve to immobilize nutrients. At the end of the growing season massive plant death releases accumulated nutrients. Declines in pH at this time also promote nutrient release and low temperatures suppress de-nitrification (Strickland 1986).

Evaporative effects can markedly alter wetland hydrological regimes and thus nutrient budgets. Water losses by evaporation can vary widely from a low of 60 percent to well over 100 percent of those from an equivalent open water surface. Evaporative processes can change the nutrient status of wetlands by a process of concentrating nutrients through water loss (Howard-Williams 1985).

Characteristics of Wetlands that Maximize Nutrient Treatment

Many nutrients are held in the wetland system and recycled through successive growing seasons of plant growth, death and decay. If water leaves the system through seepage of ground water, filtration through soils, peat, or other substrates removes excess nutrients and other pollutants. If water leaves over the surface, nutrients trapped in substrate and plant tissues during the growing season do not contribute to noxious algae blooms and excessive aquatic weed growths in downstream rivers and lakes. Excess nutrients from decaying plant tissues released during the non growing season have less effect on downstream waters (Hammer, 1992).

Water velocity decreases with decreasing slope. As water velocity decreases, the potential for nutrient removal increases. This effect is maximized when water depth in a wetland does not exceed 50 percent of plant height. Wetlands with no outlets or constricted outlets (and therefore greater water retention times) have an increased probability of sedimentation, adsorption, biological processing, and retention of nutrients. The presence of vegetation offers frictional resistance to water, acts to bind sediment, and favors nutrient burial. Nutrient uptake is generally highest by emergent plants, particularly persistent species. However, because different vegetation forms are involved in removing nutrients in different ways, a diversity of vegetation classes ensures that most nutrient cycling processes will be present. For phosphorous removal, a wetland needs to have primarily alluvial, ferric, clay, or other underlying fine soils because these sediments contain high levels of aluminum, calcium, or iron that favor the removal of phosphorus. Nitrogen is best removed by permanently flooded or saturated conditions or by irregularly fluctuating water conditions in floodplain areas. For maximum nitrogen removal, the presence of use highly organic soils is needed (Marble 1992).



Appendix D

Wildlife Species Suspected or Documented on the Wood River Property

Introduction

This appendix contains a list of the wildlife (terrestrial, aquatic, and avian) suspected and/or documented as occurring on the Wood River property. The list may not be complete and will be updated as information becomes available.

Wood River Property Preliminary Wildlife Species Species Occurrence*

Herptiles		California Myotis	P
Long-toed Salamander	P	Big Brown Bat	P
Rough-skinned Newt	P	Hoary Bat	P
Western Toad	P	Pallid Bat	P
Pacific Chorus Frog	D	Townsend's Big-eared Bat	P
Bullfrog	P	Nuttall's Cottontail	P
Spotted Frog	D	Snowshoe Hare	P
Western Pond Turtle	P	White-tailed Jackrabbit	P
Western Fence Lizard	P	Black-tailed Jackrabbit	P
Short-horned Lizard	P	Least Chipmunk	P
Sagebrush Lizard	P	Yellow Pine Chipmunk	P
Western Skink	P	Yellow-bellied Marmot	D
Rubber Boa	P	Belding Ground Squirrel	P
Ringneck Snake	P	California Ground Squirrel	P
Yellow-bellied Racer	P	Western Gray Squirrel	P
Gopher Snake	P	Northern Pocket Gopher	P
Common Garter Snake	P	Mazama Pocket Gopher	P
Western Terrestrial Garter Snake	P	Beaver	D,R
Western Rattlesnake	P	Western Harvest Mouse	P
Mammals		Deer Mouse	P
Merriam Shrew	P	Bushy-tailed Woodrat	P
Vagrant Shrew	P	Dusky-footed Woodrat	P
Trowbridge Shrew	P	Heather Vole	R
Northern Water Shrew	P	Mountain Vole	P
Water Shrew	P	California Vole	R
Broad-footed Mole	P	Long-tailed Vole	P
Little Brown Myotis	P	Townsend's Vole	R
Yuma Myotis	P	Muskrat	D,R
Fringed Myotis	P	House Mouse	P

Appendix D - Animal Species on Wood River Property

Norway Rat	P	Common Goldeneye	S
Western Jumping Mouse	P	Bufflehead	D,S
Porcupine	D	Common Merganser	D,S
Coyote	D,R	Hooded Merganser	D,S
Black Bear	T	Virginia Rail	S
Ringtail	SP	Yellow Rail	D,S
Raccoon	D,R	Sora Rail	D,S
Mink	D	American Coot	D,R
Long-tailed Weasel	P	American Avocet	D,S
Short-tailed Weasel	P	Black-necked Stilt	S
Badger	P	Long-billed Dowitcher	D,T
Spotted Skunk	P	Killdeer	D,S
Striped Skunk	D,R	Willet	D,S
River Otter	D,R	Greater Yellowlegs	T
Mountain Lion	T	Lesser Yellowlegs	T
Bobcat	D,T	Long-billed Curlew	S
Grey Fox	T	Spotted Sandpiper	D,S
Red Fox	T	Least Sandpiper	D,T
Elk	P	Wilson's Phalarope	D,S
Mule Deer	P	Common Snipe	D,S
Birds		Dunlin	S
Western Grebe	D,S	Ring-billed Gull	D,R
Eared Grebe	D,S	California Gull	R
Pied-billed Grebe	D	Bobaparte's Gull	D
Horned Grebe	D,S	Forster's Tern	D,S
Clark's Grebe	S	Black Tern	D,S
American White Pelican	D,S	Caspian Tern	S
Common Loon	D,T	Turkey Vulture	D,S
Double-crested Cormorant	D	Golden Eagle	D
American Bittern	T	Bald Eagle	D
Least Bittern	P	Northern Harrier	D,R
Black-crowned Night Heron	D,R	Sharp-shinned Hawk	R
Great Egret	D,S	Cooper's Hawk	R
Snowy Egret	S	Red-tailed Hawk	D,R
Great Blue Heron	D,R	Rough-legged Hawk	S
White-faced Ibis	S	Osprey	D,S
Sandhill Crane	D,S	American Kestrel	D,R
Tundra Swan	D,T	Prairie Falcon	R
Greater White-fronted Goose	D,T	Peregrine Falcon	T
Snow Goose	D,T	California Quail	R
Ross' Goose	T	Ring-necked Pheasant	R
Canada Goose	D,R	Rock Dove	R
Mallard	D,R	Mourning Dove	D,S
Gadwall	D,S	Common Barn Owl	D,R
Green-winged Teal	D,S	Short-eared Owl	S
American Wigeon	D,R	Long-eared Owl	R
Northern Pintail	D,S	Great-horned Owl	D,R
Northern Shoveler	D,S	Western Screech Owl	R
Blue-winged Teal	D,S	Northern Saw-whet Owl	T
Cinnamon Teal	D,S	Vaux's Swift	T
Ruddy Duck	D,R	Common Nighthawk	P
Wood duck	D,S	Anna's Hummingbird	S
Canvasback	D,R	Calliope Hummingbird	T
Redhead	D,S	Rufous Hummingbird	T
Ring-necked Duck	D,S	Belted Kingfisher	D,R
Lesser Scaup	D,S	Northern Flicker	R
Barrow's Goldeneye	S	Red-naped Sapsucker	S

Red-breasted Sapsucker	R	White-crowned Sparrow	S
Downy Woodpecker	R	Golden-crowned Sparrow	S
Hairy Woodpecker	R	Fox Sparrow	T
Western Kingbird	S	Dark-eyed Junco	R
Ash-throated Flycatcher	S	Lincoln's Sparrow	T
Olive-sided Flycatcher	T	Lark Sparrow	S
Western Wood-pewee	S	Western Meadowlark	D,S
Say's Phoebe	S	Yellow-headed Blackbird	D,S
Cordilleran Flycatcher	S	Brewer's Blackbird	D,S
Willow Flycatcher	D,S	Red-winged Blackbird	D,S
Horned Lark	D,R	Tri-colored Blackbird	D,S
Tree Swallow	D,S	Brown-headed Cowbird	D,S
Violet-green Swallow	S	Northern Oriole	D,S
Cliff Swallow	D,T	Western Tanager	D,T
Bank Swallow	D,T	House Sparrow	R
Northern Rough-winged Swallow	D,S	Pine Siskin	T
Barn Swallow	D,R	American Goldfinch	D,R
Scrub Jay	R	Lesser Goldfinch	R
Black-billed Magpie	D,R	Purple Finch	R
Common Raven	D,R	Cassin's Finch	R
American Crow	R	House Finch	R
Black-capped Chickadee	D,T	Evening Grosbeak	R
Mountain Chickadee	T		
Bushtit	R		
House Wren	D,S		
Marsh Wren	D,R		
Bewick's Wren	R		
Winter Wren	S		
Ruby-crowned Kinglet	T		
Golden-crowned Kinglet	T		
Blue-gray Gnatcatcher	T		
American Robin	D,R		
Varied Thrush	T		
Western Bluebird	R		
Loggerhead Shrike	S		
Northern Shrike	S		
Cedar Waxwing	D,S		
Solitary Vireo	D,S		
European Starling	D,R		
Warbling Vireo	D,S		
Orange-crowned Warbler	T		
Nashville Warbler	S		
Yellow-rumped Warbler	D,S		
Yellow Warbler	D,S		
MacGillivray's Warbler	S		
Wilson's Warbler	D,S		
Common Yellowthroat	D,S		
Black-headed Grosbeak	D,S		
Lazuli Bunting	S		
Green-tailed Towhee	T		
Rufous-sided Towhee	T		
California Towhee	R		
Vesper Sparrow	S		
Brewer's Sparrow	S		
Savannah Sparrow	D,S		
Song Sparrow	D,R		
Chipping Sparrow	S		

* Abbreviations used in the Occurrence column

P = Probable Occurrence
D = Documented Occurrence
R = Resident
S = Seasonal
T = Transient

the 1990s, the number of people in the UK who are aged 65 and over has increased from 10.5 million to 13.5 million, and the number of people aged 75 and over has increased from 4.5 million to 6.5 million (Office for National Statistics 2000).

There is a growing awareness of the need to address the needs of older people, and the UK Government has set out a strategy for the 21st century (Department of Health 1999). The strategy is based on the principle of 'active ageing', which is defined as 'the process of optimising opportunities for health, participation in society and security in old age' (Department of Health 1999, p. 1).

The strategy is based on three pillars: health, participation and security. The Department of Health has set out a number of objectives for each pillar, and has identified a number of key areas for action. The key areas for action are: health, participation, security, and the environment.

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Appendix E

Plant Species on Wood River Property

Introduction

The following preliminary list of plant species was developed by a Klamath Falls Resource Area botanist after a partial survey of the Wood River property. Because this survey did not cover the entire property, and conducted during two seasons in all probability, not all plant species present were located. This list will be updated as new information is gathered.

Wood River Property Preliminary Plant Species List (as of 9/94)

Common Name	Scientific Name
Yarrow	<i>Achillea millefolium</i>
Idaho Bentgrass	<i>Agrostis idahoensis</i>
Spike Bentgrass	<i>Agrostis exarata</i>
Rough Hair Grass	<i>Agrostis scabra</i>
American Waterplantain	<i>Allisma plantago-aquatica</i>
Shortawn Foxtail	<i>Alopecurus aequalis</i>
Meadow Foxtail	<i>Alopecurus pratensis</i>
Fireweed Fiddleneck	<i>Amsinckia intermedia</i>
Douglas' Sagebrush	<i>Artemisia douglasiana</i>
Nodding Beggars-tick	<i>Bidens cernua</i>
Cheatgrass	<i>Bromus tectorum</i>
Shepard's Purse	<i>Capsella bursa-pastoris</i>
Water Sedge	<i>Carex aquatilis</i>
Slenderbeaked Sedge	<i>Carex athrostachya</i>
Slender Sedge	<i>Carex lasiocarpa</i>
Sitka Sedge	<i>Carex sitchensis</i>
Beaked Sedge	<i>Carex utriculata</i>
Yellow Starthistle	<i>Centaurea solstitialis</i>
Pitseed Goosefoot	<i>Chenopodium berlandieri</i>
Canada Thistle	<i>Cirsium arvense</i>
Elk Thistle	<i>Cirsium scariosum</i>
Bull Thistle	<i>Cirsium vulgare</i>
Western Water-hemlock	<i>Cicuta douglasii</i>
Narrow-leaf Collomia	<i>Collomia linearis</i>
Tufted Hairgrass	<i>Deschampsia cespitosa</i>
Needle Spikerush	<i>Eleocharis acicularis</i>
Spikerush	<i>Eleocharis macrostachya</i>
Giant Wildrye	<i>Elymus cinereus</i>
Quackgrass	<i>Elytrigia repens (Agropyron r.)</i>
Fireweed	<i>Epilobium angustifolium</i>
Willow Herb	<i>Epilobium ciliatum var. ciliatum</i>
Field Horsetail	<i>Equisetum arvense</i>

Wood River Property Preliminary Plant Species List (continued)

Common Name	Scientific Name
Philadelphia fleabane	<i>Erigeron philadelphicus</i>
Wormseed Mustard	<i>Erysimum cheiranthoides</i>
Bedstraw	<i>Galium aparine</i>
Small Bedstraw	<i>Galium trifidum</i>
Mannagrass	<i>Glyceria borealis</i>
Tall Mannagrass	<i>Glyceria elata</i>
Cudweed	<i>Gnaphalium palustre</i>
Sneezeweed	<i>Helenium autumnale var. montanum</i>
Cow Parsnip	<i>Heracleum lanatum</i>
Common Mare's Tail	<i>Hippuris vulgaris</i>
Meadow Barley	<i>Hordeum brachyantherum</i>
Foxtail Barley	<i>Hordeum jubatum</i>
Baltic Rush	<i>Juncus balticus</i>
Dagger Leaf Rush	<i>Juncus ensifolius</i>
Sierra Rush	<i>Juncus nevadensis</i>
Red Belvedere	<i>Kochia scoparia</i>
Prickly Lettuce	<i>Lactuca scariola</i>
English pepperweed	<i>Lepidium campestre</i>
Clasping Pepperweed	<i>Lepidium perfoliatum</i>
Duckweed	<i>Lemna minor</i>
Prairie Lupine	<i>Lupinus lepidus</i>
Bigleaf Lupine	<i>Lupinus polyphyllus</i>
Mountain Tarweed	<i>Madia glomerata</i>
Pineapple Weed	<i>Matricaria matricarioides</i>
Sweet Clover	<i>Melilotus officinalis</i>
Wocus, Spatterdock	<i>Nuphar polysepalum</i>
Nemophila	<i>Nemophila pedunculata</i>
Canary Reed-grass	<i>Phalaris arundinacea</i>
Common Knotweed	<i>Polygonum aviculare</i>
Douglas' Knotweed	<i>Polygonum douglasii</i>
Knotweed	<i>Polygonum sp.</i>
Rabbitfoot Grass	<i>Polypogon monspeliensis</i>
Kentucky Bluegrass	<i>Poa pratensis</i>
Bluegrass	<i>Poa sp.</i>
Black Cottonwood	<i>Populus trichocarpa</i>
Swamp Currant	<i>Ribes lacustre</i>
Curly Dock	<i>Rumex crispus</i>
Golden Dock	<i>Rumex maritimus</i>
Dock	<i>Rumex sp.</i>
Willow	<i>Salix sp.</i>
Marsh Skullcap	<i>Scutellaria galericulata</i>
Hardstem Bulrush	<i>Scirpus acutus</i>
Star-Flowered False Solomon's Seal	<i>Smilacina stellata</i>
Tumble Mustard	<i>Sisymbrium altissimum</i>
Bitter Nightshade	<i>Solanum dulcamara</i>
Broadfruited Bur-reed	<i>Sparanium eurycarpum</i>
Hedge Nettle	<i>Stachys rigida</i>
Fan-weed	<i>Thlaspi arvense</i>
Western Salsify	<i>Tragopogon dubius</i>
Alsike Clover	<i>Trifolium hybridum</i>
White Clover	<i>Trifolium repens</i>
Common Cattail	<i>Typha latifolia</i>
Hoary Nettle	<i>Urtica dioica ssp. holosericea</i>
Bladderwort	<i>Utricularia sp.</i>
Common Mullein	<i>Verbascum thapsis</i>

Appendix F

Stream Channel and Wetland Restoration Options

Introduction

This appendix describes a number of options for doing both stream channel restoration and wetland restoration. Each of these options is used in one or more of the management alternatives described in Chapter 3 to accomplish the different alternative's management objectives. It is the combination of options to be used that makes each alternative unique. Since Alternative A would not restore the property to a wetland condition, none of these options apply to that alternative.

These options (with the exception of Stream Channel Restoration Option 4) were originally developed by the U.S. Bureau of Reclamation's (USBR) Denver office, before detailed topography was available, and were modified by the BLM to fit the management alternatives. The USBR's original options were separated by geographic region, including the Wood River property's north half, south half, and Marsh (Outside [east of] main property's interior; see Map 3). For simplicity, they were combined in this appendix. Most of the options could be initiated for the north half only, the south half only, or the entire parcel.

Each option listed below includes a description of the option, the structural requirements (such as new berms or water control needs), additional information needs, schedules of completion, and the apparent benefits and problems of that option. Each option description also includes the alternatives in Chapter 3 that could implement the option to accomplish the wetland or stream restoration objectives of the alternative. See Table 4 in Chapter 3 and Table 5 in Chapter 4 for a graphic comparison of the options used in each alternative. See alternative maps in Chapter 3 for a conceptual view of these options.

Stream Channel Restoration

Option 1: Restore the Wood River by establishing a meandering flow pattern in the Wood River Marsh (outside the dike from the main property's interior).

Description. Current conditions within the Wood River Marsh are modified to provide fish habitat elements by establishing a meandering flow pattern within the existing marsh. This includes dredging of channels within the existing marsh and maintaining existing levees. Provide dredged channel by copying the meandering pattern of the Wood River shown on historic aerial photography.

Structural Requirements. Dredging of channel to create meanders, placement of fill material in portions of existing (straight) dredged channel.

Information Needs. Wood River channel hydraulics and hydrology, sediment load estimate, and historic channel pattern data for Wood River property.

Scheduling. Could be done at the same time with any other option. Permanent.

Appendix F - Stream and Wetland Restoration Options

Assumed Advantages. Improved fish habitat conditions within the Wood River Marsh.

Assumed Disadvantages. Could have expensive data collection and design components. Acquiring permits for wetland dredging could be lengthy and could require mitigation.

Applies to: Alternatives B and C.

Option 2: Restore wetland by establishing a meandering flow pattern for Sevenmile Creek through the main property's interior.

Description. Restore wetland on the south half by creating shallow channels extending from the Sevenmile Creek at the northwest corner of the south half, and outflow to the lake through the southern perimeter berm. Restore wetland on the north half supported by inflows from the Sevenmile Creek and outflow to the lake through the south half. New channels are designed to be consistent with the historic meander patterns and flow routing through the property. Strategy completely inundates the south half, which is isolated by containment berms. Water passes through the restored wetland area on the property. High water levels are likely to submerge the entire area such that inflow is not confined to channels, whereas low water may tend to follow channels through the area. Modify containment berm between north and south halves to allow flow through. Restore wetland to intercept Sevenmile Creek water while maximizing the fish passage and extent of habitat accessible to fish species. Construction of control structures and fill placement will require federal and state permits.

Structural Requirements. Water controls upstream at the Sevenmile Creek connection and the downstream perimeter berm to release water from the south/north half to the lake. Modify containment berm between north and south halves to allow flow through. Filling existing drainage system on the property. Excavate new meandering channels through the main property's interior.

Information Needs. Containment by berms along property's midway canal. Ability to divert flow from Sevenmile Creek. Effects of water level fluctuations in Agency Lake on the operation of water directed through the restored wetland area. Design criteria for channels and water control structures.

Scheduling. Could be initiated any time after design issues are resolved, with the south half completed before the north half. Initiate as permanent phase after wetland ecosystem is established. This option is considered permanent, and moderately difficult to reverse.

Assumed Advantages. Relatively low maintenance requirements anticipated to sustain restored wetland in the long term. Moderate cost as existing drainages are filled. Offers greatest potential for fish habitat values and passage to riverine systems. Enhancement potential for waterfowl and other wetland species. Material to fill drainage system can be produced from stream channel excavation work. Sediment transport and stagnation problems are reduced with channels. Consistent with historic wetland conditions within site constraints.

Assumed Disadvantages. Habitat improvement performance attributes are not entirely defined. Water quality improvement characteristics are incidental and performance is unknown.

Applies to: Alternative B.

Option 3: Restore wetland by establishing a meandering flow pattern for Wood River through the main property's interior.

Description. Restore wetland on the south half by creating shallow channels extending from the Wood River at the northeast corner of the south half, and outflow to Agency Lake through the southern perimeter berm. New channels are designed to be consistent with the historic meander patterns and flow routing through the main property's interior. Restore wetland on the north half supported by inflows from Wood River and outflow to the lake through the south half. New channels are designed to be consistent with the historic meander patterns and flow routing through the property. Strategy completely inundates the south half, which is isolated by containment

berms. Water passes through the restored wetland area. High water levels are likely to submerge the entire area such that inflow is not confined to channels, whereas low water may tend to follow channels through the area. Modify containment berm between south and north halves to allow flow through. Restore wetland to intercept Wood River water while maximizing the fish passage and extent of habitat accessible to fish species. Construction of control structures and fill placement will require federal and state permits.

Structural Requirements. Water controls upstream at the Wood River connection and the downstream perimeter berm to release water from the south half to the lake. Modification of containment berm between north and south halves. Filling existing drainage system on the property. Excavate new meandering channels through the main property's interior.

Information Needs. Containment by berms along property's midway canal. Flow information, and sediment estimate. Ability to divert flow from Wood River. Effects of water level fluctuations in Agency Lake on the operation of water directed through the restored wetland area. Water flow effects on the Wood River Marsh east of the Wood River. Design criteria for channel and diversion.

Scheduling. Could be initiated any time after design issues are resolved, with the south half completed before the north half. Initiate as permanent phase after wetland ecosystem is established. This option is considered permanent, and moderately difficult to reverse.

Assumed Advantages. Relatively low maintenance requirements anticipated to sustain restored wetland in the long term. Offers potential for improved fish habitat and passage to riverine systems. Enhancement potential for waterfowl and other wetland species. Material to fill drainage system can be produced from channel excavation work. Sediment transport and stagnation problems are reduced with channels. Some evidence (on aerial photos) of historic wetland flow from the Wood River through the southeast area of the property, although not distinct. Best opportunity appears to be if option is done in conjunction with corresponding Sevenmile Creek option.

Assumed Disadvantages. Habitat improvement performance attributes are not entirely defined. Water quality improvement characteristics are incidental and performance is unknown. Existing berm on the east side of the property could make water control between the restored wetland and existing Wood River Marsh more complicated than the Sevenmile Creek configuration (Option 2).

Applies to: Alternative B.

Option 4: Restore meandering flow patterns for the Wood River and Sevenmile Creek by relocating portions of the existing levees along these streams.

Description. Prior to relocating and removing portions of the existing levees along the east bank of Sevenmile Creek and the west bank of the Wood River, new channel meanders for the Wood River could be constructed. New levees would also be constructed 50 to 400 meters toward the property's interior from the existing levees. Portions of the existing levees could be left in place as islands, used in the construction of new levees, or used to construct point bars in the stream channels. Natural hydrologic processes would then be allowed to establish wider riparian areas and flood plains, along the east bank of Sevenmile Creek and the west bank of the Wood River, and to enhance channel sinuosity.

Structural Requirements. Excavate any new channel meanders along Wood River. Construct new levees and roads interior to the existing levees and roads along Sevenmile Creek and the Wood River.

Information Needs. Design criteria for creating channel meanders, new levee location, sediment budget, and effects on flows and water quality in the Wood River.

Scheduling. Could be initiated any time after the design is completed. The south half would likely be completed

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before the north half, and the portion along Wood River would likely be completed before the portion along Sevenmile Creek. This option is considered permanent, and difficult to reverse.

Assumed Advantages. This approach keeps riverine and wetland habitats separated. It offers the opportunity for natural hydrologic processes to develop channel sinuosity and structural complexity over time. This would create excellent refugial habitat for fish. It will create a wider riparian area and floodplain than other alternatives. It should result in less dredge and fill material being moved than other alternatives, and this should result in less sediment entering the streams and Agency Lake.

Assumed Disadvantages. Could have expensive design components, and require dredge and fill permits. Some fill material may have to be brought in from off site.

Applies to: Alternative D.

Wetland Restoration

Option 1: Restore wetland by operating the existing canal and pump system.

Description. Restore wetland on the north/south halves of the property by operating the existing canal and pump system to establish, as well as maintain, a wetland ecosystem. This strategy would vary in the number of wetland cells, containment berms, water control structures, and canals that would exist under the various alternatives. Alternative B would have 2 wetland cells; Alternative C would have 9 to 20 wetland cells; and Alternative D would have 4 to 8 wetland cells. Relies on existing mechanisms to introduce water to the area, while the pump system is used to remove or circulate water through the area. Restore wetland and manipulate water levels to establish or maintain habitat for certain species, and to manage wetland vegetation.

Structural Requirements. Check and rehabilitate existing systems as needed. Additional containment berms and water control structures would be required under Alternatives C and D.

Information Needs. Containment by berms along property midway canal. Operation's susceptibility to seasonal water level fluctuations. Design for wetland cell configuration and water control structures under Alternatives C and D. Develop a schedule for operations.

Scheduling. Could be initiated any time as a permanent operating mode. Could be applied as an interim strategy to establish wetland vegetation in preparation for other options. Incorporate in scheduling of staged implementation plans for other options, or initiate as a permanent wetland operating strategy. Fairly easily reversed.

Assumed Advantages. Keeps fish habitat (riverine system) separate from the internal wetland. Does not appear to alter existing land and water use practices nearby. Habitat values enhanced for waterfowl and other wetland-dependent species. Allows water management to enhance habitat. Can be implemented in conjunction with Option 2. Provides for improved water quality for water leaving the wetland.

Assumed Disadvantages. Has no potential to improve fish habitat conditions unless conveyance structures are added to allow passage into the restored wetland area. Even then, there is no connectivity to the riverine systems since water is pumped out of the area. Stagnant conditions may be reduced by operating the pumping systems to improve circulation or to dry the area temporarily. Moderately high maintenance costs. These costs would increase with the number of wetland cells, containment berms, and water control structures added.

Applies to: Alternatives B, C, and D.

Option 2: Restore wetland by re-establishing the lake-wetland interface (opening the property's interior to prevailing water levels in Agency Lake).

Description. Restore wetland that is supported solely by lake water levels, to reduce or eliminate the need for water control manipulations. Establish wetland on the south half of the property by opening an area (wetland cells) to prevailing water levels in Agency Lake. Could consist of pipes installed through the containment dike along the southern perimeter, to allow lake water passage to and from the south half. Strategy completely inundates the wetland cell(s) that are open to the prevailing lake level. Rely only on ambient water levels in the lake to provide water to the wetland cell(s), subject to variations according to seasonal fluctuations. Construction of control structures and fill placement will require federal and state permits.

Structural Requirements. Culvert pipe or other structure system, with or without control gates.

Information Needs. Containment by berms along the perimeter of the wetland cell. Design for installation. Develop a schedule for operations.

Scheduling. Could be initiated any time. Best construction time at low water levels. Initiate when area can be dedicated permanently for wetlands. This option is considered permanent, although fairly easily reversed.

Assumed Advantages. Moderate costs associated with culvert pipe systems. Low management needs after initial establishment period. Does not alter nearby land and water use practices. Increased water depth of this cell increases water storage potential.

Assumed Disadvantages. Restoration of the south half has relatively little potential to substantially improve fish habitat conditions since there may be no connectivity to the riverine systems. Flow patterns are not consistent with mechanisms that improve water quality, in fact stagnant water conditions are likely.

Applies to: Alternatives B, C, and D.

Option 3: Restore wetland supported by inflows from Sevenmile Creek (no pre-defined path) and outflow to Agency Lake.

Description. Restore wetland to intercept Sevenmile Creek water without restoring historic channels or creating new channels to direct flows through the area. Wetland on the south/north halves of the property would be supported by inflows from the Sevenmile Creek at the northwest corner of the south half, and outflow to the lake through the southern perimeter levee. Existing canals in the property area could either be left open, or filled depending on the anticipated interaction with flows. Strategy completely inundates the south half, which is isolated by containment berms. Water passes through the restored wetland area without a pre-defined path, that is, the flow route is subject to the existing site topography.

Structural Requirements. Water controls at Sevenmile Creek inflows and at the southern perimeter berm to release water from the south half to the lake. Center containment berm raised and strengthened.

Information Needs. Design for berm along property's midway canal, and control structures. Ability to divert flow from Sevenmile Creek. Effects of water level fluctuations in Agency Lake on the operation of water directed through the restored wetland area. Establish a schedule of operations.

Scheduling. Could be initiated any time after design issues are resolved, with the south half completed before the north half. Initiate as permanent phase after wetland ecosystem is established. This option is considered permanent, although fairly easily reversed.

Assumed Advantages. Low costs associated with conveyance structures, up to moderate costs to work on center containment berm or if existing canals are filled. Appears to offer some potential for fish habitat and passage to riverine systems, at least during higher flows. Fairly easy to implement and operate.

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Assumed Disadvantages. Does not restore historic meandering channel such that the water distribution through the restored wetland is not defined. As a result, the sediment transport, stagnation problems, and associated habitat values for fish are unknown. Extensive fill material would have to be imported to raise and strengthen center control berm or if the internal canals on the property are filled. Water quality improvement characteristics are incidental, and performance is unknown. Enhancement potential for waterfowl and other wetland species limited by deep water on the south half.

Applies to: Alternative B.

Option 4: Restore wetland supported by inflows from Wood River (no pre-defined path) and outflow to Agency Lake.

Descriptions. Restore wetland to intercept Wood River water without restoring historic channels, or creating new channels to direct flows through the area. Wetland on the south half of the property would be supported by inflows from Wood River at the northeast corner of the south half, and outflow to the lake through the southern perimeter levee. Wetland in north half would be supported with inflows from Wood River through the eastern perimeter levee. Existing canals on the property area could either be left open or filled depending on the anticipated interaction with flows. Strategy completely inundates the south half, which is isolated by containment berms. Water passes through the restored wetland area without a pre-defined path, that is, the flow route is subject to the existing site topography. Construction of control structures and fill placement will require federal and state permits.

Structural Requirements. Water controls at Wood River inflows and at southern perimeter levee to release water from the south half to the lake. Center control berm raised and strengthened.

Information Needs. Design for containment by berm along property's midway canal. Flow information, sediment estimate. Ability to divert flow from Wood River. Effects of water level fluctuations in Agency Lake on the operation of water directed through the restored wetland area. Water flow effects on the existing Wood River Marsh, east of the Wood River. Establish a schedule of operations.

Scheduling. Could be initiated any time after design issues are resolved, with the south half completed before the north half. Appears to be advantageous to undertake in conjunction with corresponding Sevenmile Creek option. Initiate as permanent phase after wetland ecosystem is established. This option is considered permanent, although fairly easily reversed.

Assumed Advantages. Low costs associated conveyance structures, up to moderate costs for raising and strengthening center berm or if existing canals are filled. Appears to offer some potential for fish habitat and passage to riverine systems, at least during higher flows. Fairly easy to implement and operate.

Assumed Disadvantages. Does not restore historic meandering channel such that the water distribution through the restored wetland is not defined. As a result, the sediment transport, stagnation problems, and associated habitat values for fish are unknown. Extensive fill material would have to be imported if the internal canals on the property are filled. Water quality improvement characteristics are incidental and performance is unknown. Existing berm on the east side of the property could make water control between the restored wetland and existing Wood River Marsh more complicated than the Sevenmile Creek configuration. Enhancement potential for waterfowl and other wetland species would be limited by deep water on the south half.

Applies to: Alternative B.

Option 5: Construct and operate small pilot study areas, primarily to refine design details and operating procedures necessary to proceed with intensive wetland restoration and water quality improvement projects on the Wood River property or on other lands.

Description. Consists of constructing and operating small water quality improvement study plots, primarily to refine design details and operating procedures necessary to proceed with full scale water quality intensive wetland implementation plans. Pilot areas could also be useful for conjunctive studies of habitat attributes and wetland restoration techniques, although these characteristics may be better evaluated in existing Wood River Marsh and restored wetland areas. Begin with the construction of one-acre facilities at the southwest and northeast corners of the south half of the property. These sites offer different water sources and appear to be logistically convenient for existing pumping facilities. To address the essential feasibility and design related questions required to proceed with full scale water quality intensive remediation actions adjunct use may be added if consistent with the experimental program and as funds allow. Pilot projects would ultimately cover a majority of the property.

Structural Requirements. Unknown until specific projects are defined.

Information Needs. Clear objectives regarding water quality improvement goals. Detailed plans to address alternate approaches and key issues. Operating plan with stages leading to ultimate conditions. Compatibility with concurrent activities or ability to integrate with other options.

Scheduling. Planning and construction of pilot facilities could begin at any time. Pilot studies are undertaken to define water quality wetland detailed design and operating parameters prior to full system scale implementation. Each pilot project could last for up to ten years or until adequate study results have been collected.

Assumed Advantages. Allows critical questions to be addressed prior to greater expenditures of time and money on full scale water quality wetland systems. Small pilot areas could be installed and operated for an interim period concurrently with other options.

Assumed Disadvantages. Possibly high costs of construction and commitment of resources to accomplish experimental test program. This option is only justified if full-scale water quality wetland remediation approaches and integration with long-term restoration plans are feasible.

Applies to: Alternative C.

Option 6: Establish a wetland system/water quality treatment system that is designed to provide the specific flow distribution, retention time, and contact characteristics (vegetation/water contact) that enhance water treatment performance.

Description. Consists of establishing a wetland system that is designed to provide specific flow distribution, retention time, and contact characteristics that enhance water treatment performance. The water quality intensive system could ultimately be either converted to restored wetland that is self sustaining or one that requires long-term manipulation and maintenance. The system would be consistent with management goals and objectives. Construct designed wetland area (south half) and flow routing system (north half) with internal berms and controls to induce the desired hydrodynamic attributes. Develop operating plan and staged conversion to ultimate conditions. Operate wetland treatment system for specified time to improve the quality of water either in the lake system, or to intercept inflow loading at critical times. Construction of control structures and fill placement will require federal and state permits.

Structural Requirements. Earthwork, control structures, and pump systems as required.

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Information Needs. Performance attributes in relation to watershed conditions and limitations of alternate approaches. Clear objectives regarding water quality improvement goals. Detailed design criteria and operating plan with stages leading to ultimate conditions. Compatibility with concurrent activities or ability to integrate with other options. Pilot studies appropriate to precede large scale implementation.

Scheduling. Staged approach and specific plans are critical to option success. At least three distinct phases; (1) pilot studies, (2) full scale wetland operation, (3) restore areas to ultimate, self-sustaining wetland condition if possible. Exact term of each stage remains to be determined. Permanent, following completion of all stages.

Assumed Advantages. Enhanced water quality improvement using passive techniques consistent with ecosystem attributes and thereby easily converted to self sustained wetland ecosystem. Greatest level of water quality improvement.

Assumed Disadvantages. Relatively high costs can only be justified by significant remediation benefits relative to alternative strategies. Actual watershed remediation is likely to depend on other conjunctive actions to control loading sources and manage water and land resources. Could delay wetland restoration objectives. Requires long term planning and management commitment. Conflicts with more immediate options to restore historic wetland conditions. Site selection is critical since water control requirements and ultimate conversion of this option may be more easily accomplished at alternate sites.

Applies to: Alternative C.

Appendix G Wood River Potential Area of Critical Environmental Concern Evaluation

Introduction

An Area of Critical Environmental Concern (ACEC) designation highlights an area where special management attention is needed by the Bureau of Land Management (BLM) to protect and prevent irreparable damage to important historic, cultural, and scenic values; fish or wildlife resources; other natural systems or processes; or to protect human life and safety from natural hazards. The ACEC designation indicates to the public that the BLM not only recognizes the area possesses significant values, but has also established special management measures to protect those values. Designation serves as a reminder that the significant values or resources must be accommodated during the BLM's consideration of subsequent management actions and land use proposals near or within an ACEC.

To be considered as a potential ACEC and analyzed as such in resource management plan (RMP) alternatives, inventory data must be analyzed to determine whether there are areas containing significant resources, values, systems or processes, or hazards. To be designated an ACEC, an area must meet both the relevance and importance criteria established and defined in 43 CFR 1610.7-2. They are defined as follows:

Relevance. There shall be present a significant historic, cultural, or scenic value; fish or wildlife resource; other natural system or process; or natural hazard.

Importance. The above described value, resource, system, process, or hazard shall have substantial significance and values. This generally requires qualities of more than local significance and special worth, consequence, meaning, distinctiveness, or cause for concern. A natural hazard can be important if it is a significant threat to human life or property.

As a result of a BLM interdisciplinary team evaluation, Native American traditional use (cultural value), special status plant species (natural process or system), and vegetation (natural process or system) were included as reasons for further consideration of the Wood River property as a potential ACEC.

This appendix evaluates relevance criteria first, then importance criteria, followed by a summary and conclusion.

Relevance

As described in BLM Manual 1613, an area meets the "relevance" criterion if it contains one or more of the following:

- ◆ A significant historic, cultural, or scenic value (including but not limited to rare or sensitive archaeological resources and religious or cultural resources important to Native Americans).
- ◆ A fish and wildlife resource (including but not limited to habitat for endangered, sensitive or threatened species, or habitat essential for maintaining species diversity).
- ◆ A natural process or system (including but not limited to endangered, sensitive, or threatened plant species; rare, endemic, or relic plants or plant communities which are terrestrial, aquatic, or riparian; or rare geologic features).
- ◆ Natural hazards (including but not limited to areas of avalanche, dangerous flooding, landslides, unstable soils, seismic activity, or dangerous cliffs). A hazard caused by human action may meet the relevance criteria if it is determined through the resource management plan in process that it has become part of a natural process.

Cultural Values

Cultural resources (see Glossary) include prehistoric and historic resources, and Native American traditional use areas. Prehistoric resources are the remains of Native American occupation before contact with non-native people (approximately 1830 for the Klamath Basin). Historic resources are the remains of occupation of both native and non-native people after contact. Traditional use areas are geographic locations with cultural or religious importance to contemporary Native American groups.

Klamath people, notably the Kowa'cd'ikni (also spelled Kowa'cdi) are conjectured to have inhabited the area around the mouth of the Wood River into historic times. The Klamath Tribe's oral history indicates tribal use of the area. Therefore, traditional use locations are likely within the property and artifactual remains, are likely contained in and upon the earth surface within the property. The Wood River property is also known to contain peat bogs, and often, peat bogs adjacent to human occupation areas contain well-preserved cultural remains.

Supporting evidence concerning the presence of the Klamath people in the Wood River property area, within the parameters of the archaeological and historical record, is provided by three basic references. Dicken and Dicken (1985), Follansbee et al. (1978), and Mack (1991). These references confirm Native American use in the Klamath Basin and in the area of the Wood River property. The Klamath Tribe's Cultural Resources Coordinator has also furnished information regarding prehistoric and Native American traditional use values in the Wood River area.

Prehistoric Values. It is known among tribal members that there were village sites and scattered clusters of houses all along Wood River. There are permanent houses of families that used the Wood River Valley, surrounding mountains, and Agency Lake in their seasonal round. Thus it served the central area for many economic, spiritual, and social activities. Some such areas would be discernable through archaeological methods, others would not.

Native American Traditional Use Values. The specific area of the Wood River property is the most important wocus gathering area on the east side of Agency Lake. It is also a hunting area for many species of waterfowl, a fishing area, a place where duck and geese eggs are gathered, and an area for collecting the roots and plant fibers of such plants as tules and cattails.

Conclusion. The significance of the cultural values, both prehistoric resources and Native American traditional use, meet the criterion for relevance.

Fish Resources

Year-round use by the Lost River sucker, listed as endangered in accordance with the Endangered Species Act, has been documented by the Oregon Department of Fish and Wildlife (ODFW) and the Klamath Tribe. The shortnose sucker, also federally listed as endangered, may also use the area. Candidate fish species for listing under the Endangered Species Act that are documented or suspected in the Wood River area include the Klamath largescale sucker and the redband trout.

The Wood River is managed by the ODFW as a wild trout stream and contains resident, self-sustaining populations of brown trout. This is the river's main fishery resource during the summer. In the fall, native migratory rainbow trout move from Upper Klamath Lake to the Wood River to spawn. The young trout remain in the river for one to two years before moving out into Upper Klamath Lake.

Conclusion. The documented or suspected presence of native trout, two endangered sucker species, and two federal candidate and state sensitive fish species satisfies the relevance criterion for fish.

Wildlife Resources

The bald eagle, federally listed as threatened in Oregon, uses the Wood River area for both foraging and/or nesting year-round. The peregrine falcon, federally listed as endangered, may also use the area, at least seasonally. Wildlife species that are candidates for listing in accordance with the Endangered Species Act that are documented or suspected in the Wood River area include two mussel species (the California floater and the Oregon pearly), the white-faced ibis, tri-colored blackbird, black tern, loggerhead shrike, least bittern, long-billed curlew, spotted frog, western pond turtle, and three bats (fringed Myotis, Yuma Myotis, and Townsend's big-eared bat). The Wood River property is extremely important for the spotted frog, also a federal candidate species, as this is the only remaining site in Klamath County where there has been a confirmed sighting in the last five years.

The Wood River property provides habitat for a variety of wildlife species. Four main habitat-types include permanent wetlands with aquatic or emergent vegetation, pastures (or meadows) of short grass communities, woody and riparian vegetation areas, and open water areas on the lake and near the shoreline. These habitats are used for foraging (feeding), roosting (resting), nesting, breeding, brooding, rearing, staging (gathering) during migrations, denning (sheltering), and basking (sunning). Waterfowl (ducks and geese), wading birds (herons and egrets), shorebirds (sandpipers and ibis), neotropical migratory birds (tri-colored blackbirds, meadowlarks, etc.), raptors (owls, red-tailed hawks, osprey), small mammals (bats and rodents), and furbearers (otter and beaver) all use these habitats to various extents and for various purposes.

Conclusion. The documented or suspected presence of several federal and state threatened, endangered, sensitive, and candidate wildlife species, as well as a wide diversity of other wildlife species, that live in or migrate through the Wood River property area satisfies the criterion for relevance.

Natural Processes and Systems

The long-term management goal for the property would be to restore the majority of the property to a functioning wetland community. The primary objectives would be to improve water quality and quantity entering Agency and Upper Klamath lakes; and to restore and enhance wetland habitat, primarily for Lost River and shortnose suckers, and secondarily for other species.

Over the last two decades wetlands have become widely recognized as an important component of the ecosystem for their role in improving water quality, reducing flooding, providing important fish and wildlife habitat, ground-water recharge, and many other important functions. Yet, annual net wetland losses in the U.S. during the 1980s totaled more than 2.6 million acres (Frayer 1991). Wetland restoration techniques are being explored in an attempt to reverse this trend.

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Restoration of wetlands on the property will demonstrate the relationship between various environmental conditions (such as water depth and water flow) and the native wetland vegetation that will occupy those sites. Further, the site will demonstrate the relationship between the habitats that various vegetation communities provide and the wildlife species that use those habitats.

Conclusion. The long-term management goals for the Wood River property and potential for restoration, combined with the importance of wetlands satisfies the relevance criterion for the occurrence of a natural process or system.

Importance

Those values, resources, systems, processes, or hazards described under the Relevance section must have substantial significance and value to satisfy the importance criterion. This generally means that the value, resource, system, process, or hazard is characterized by one or more of the following:

- ◆ Has more than locally significant qualities which give it special worth, consequence, meaning, distinctiveness, or cause for concern, especially compared to any similar resource.
- ◆ Has qualities or circumstances that make it fragile, sensitive, rare, irreplaceable, exemplary, unique, endangered, threatened, or vulnerable to adverse change.
- ◆ Has been recognized as warranting protection to satisfy national priority concerns or to carry out the mandates of the Federal Land Policy and Management Act.
- ◆ Has qualities that warrant highlighting to satisfy public or management concerns about safety and public welfare.
- ◆ Poses a significant threat to human life and safety or to property.

Cultural Values

A number of sources have confirmed the prehistoric values and Native American uses in the Klamath Basin and in the area of the Wood River property.

Prehistoric Values. It is known among tribal members that there were village sites and scattered clusters of houses all along the Wood River. There were permanent houses of families that used the Wood River Valley, surrounding mountains, and Agency Lake in their seasonal round. Thus it served the central area for many economic, spiritual, and social activities.

Native American Traditional Use Values. The specific area of the Wood River property is the most important wocus gathering area on the east side of Agency Lake. It is also a hunting area for many species of waterfowl, a fishing area, a place where duck and geese eggs are gathered, and an area for collecting the roots and plant fibers of such plants as tules and cattails.

Conclusion. The cultural values within the proposed ACEC are fragile, sensitive, irreplaceable, and have more than local significance. The traditional use of the area by Native Americans has more than local significance, which gives it special worth, meaning, and distinctiveness. The prehistoric values and Native American traditional use within the proposed ACEC both meet the criterion for importance.

Fish Resources

The Lost River and shortnose suckers, two federal and state endangered species, are documented or suspected to occur within the proposed ACEC. Redband trout has been documented in the Wood River. The Klamath largescale sucker, federal candidate (category 2) and Oregon state sensitive species, is also likely occur within the area.

The Wood River is managed by the ODFW as a wild trout stream and contains self-sustaining populations of brown trout and native rainbow trout. This is the river's main fishery resource during the summer which draws anglers from outside the region who come to fish for more than one day.

Conclusion. The wild trout population of the Wood River is unique, fragile, sensitive, and vulnerable to adverse environmental change. Fish resources (including both the wild trout and endangered suckers) in the proposed ACEC, which are more than locally significant and have been recognized as warranting protection, meet the criterion for importance.

Wildlife Resources

There are four federally listed threatened or endangered species and fifteen federal candidate species known or suspected to occur in the proposed ACEC, including the only documented occurrence of the spotted frog in the Klamath Basin in the last five years.

Wildlife habitat within the proposed ACEC is of exceptionally high quality and diversity, as evidenced by the numbers and diversity of wildlife species living in and migrating through the area. This diversity is associated with the wetland and riparian habitats, the location of the Wood River property on the western flyway for migratory birds, and its position at the north end of Agency and Upper Klamath lakes. Birds migrating north stop to rest after the long flight over water, and birds migrating south "stack up" before flying across the lake.

Conclusion. The quality and diversity of wildlife habitats and populations in the proposed ACEC are unique and have more than local significance. Several of the species are threatened, endangered, or sensitive, and are vulnerable to adverse impacts. They satisfy the importance criterion.

Natural Processes and Systems

The Wood River property is in the Klamath River Basin, which includes portions of southern Oregon and northern California, as well as an anadromous fishery in the adjacent Pacific Ocean. Management of the property as an ACEC to restore a functioning, natural wetland and to determine the effects of those functions and processes on water quality and quantity would have implications for the whole upper Klamath Basin which in turn affects the entire Klamath River Basin. The property was recognized in the Congressional appropriations legislation for acquisition because of its location, importance to the Klamath River Basin, and its wetland restoration potential.

Conclusion. Wetland functions and processes, and their effects on water quality and quantity are of more than local significance. The importance criterion for a natural process or system is met.

Summary

For an area to be designated an ACEC it is only necessary for one value to meet both the relevance and importance criteria. Four values on the Wood River property have been found to meet the relevance criterion. Cultural values (both prehistoric values and Native American traditional use), fish and wildlife (both populations and habitat) resources, and a natural process or system. All four of those values were also found to meet the importance criterion.

Conclusion

The Wood River property meets both the relevance and importance criteria. It is identified as a potential area of critical environmental concern and is recommended for designation as such.

Appendix H

Wild and Scenic River Eligibility Determinations

Summary

Neither the Wood River nor Sevenmile Creek were found to be eligible for inclusion in the National Wild and Scenic Rivers System. They have been dropped from further consideration, which means that neither a classification determination nor a suitability assessment were conducted.

Purpose and Need

Section 5(d) of the National Wild and Scenic Rivers Act (NWSRA) (and BLM Manual 8351) states that "In all planning for the use and development of water and related land resources, consideration shall be given by all federal agencies to potential national wild, scenic, and recreational river areas". Therefore, the portions of Wood River and Sevenmile Creek that flow through or are adjacent to the recently acquired Wood River property were considered by the Klamath Falls Resource Area BLM's interdisciplinary team.

Steps to Evaluate a Potential River Segment

The steps in considering potential national wild, scenic, and recreational river areas include (1) determining if the river or river segment is eligible, (2) determining the highest possible classification of those rivers that have been found to be eligible, and (3) assessing the suitability of those rivers that have been found to be eligible.

Eligibility Criteria

To be *eligible* for inclusion in the National Wild and Scenic Rivers System, a river or river segment must be free-flowing and must possess one or more outstandingly remarkable values (ORVs). *Free-flowing*, as defined in section 16(b) of the NWSRA, means "existing or flowing in natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway." Outstandingly remarkable values include scenic, recreational, geologic, fish, wildlife, historic, cultural, or other similar values.

Eligibility Determination. The channels of the Wood River and Sevenmile Creek that flow through or are adjacent to the recently acquired Wood River property are both highly modified by straightening, dredging, and by adjoining canal embankments. The section of Sevenmile Creek that runs along the BLM-administered land has been renamed Sevenmile Canal, indicating its level of modification. Upstream from the BLM river segments (both Wood River and Sevenmile Creek) several irrigation diversions are found, greatly regulating the streamflow into

Appendix H - Wild and Scenic River Eligibility Determinations

Agency Lake. Although Alternative D, the Preferred Alternative in this draft Resource Management Plan, proposes to restore Wood River (first priority) and Sevenmile Creek (second priority) to their historic meandering channels, neither river fits the definition of free-flowing as they currently exist, and therefore, neither river was found to be eligible.

Further Consideration

Because both the Wood River and Sevenmile Creek were found not eligible, neither a classification determination nor a suitability assessment was done.

During the next planning cycle, if the stream restoration has been successfully completed, then the river segments could be studied again for potential eligibility. Until that time, no special management actions will be in effect along these river segments.

Further Information

Further information on the eligibility process and BLM interdisciplinary team results can be found in the Klamath Falls Resource Area office during regular business hours.

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